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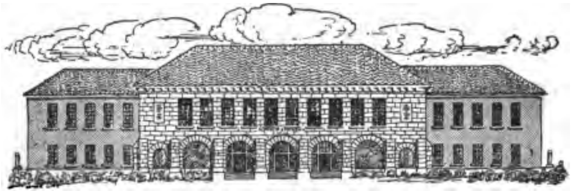

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Frontispiece

GETTING A LIVING

A Vocational Civics Reader

Compiled and Edited
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IN connection with each occupation discussed in this book the following points should be invariably considered:

First, the nature of the occupation.

Second, the chances for advancement.

Third, the educational and other qualifications necessary for success.

Fourth, the service that may be rendered to the community.

Fifth, the business ethics involved. By business ethics is meant both what the employee has a right to expect from the employer, as to hours, conditions of work, and treatment generally, and what the employer has a right to expect from the employee, namely, obedience, courtesy, helpfulness, honesty, punctuality, self-control, industry, etc.—in short, the *civic virtues*.

Without the Fourth and Fifth, the course would be one in vocational guidance only; with them, the course becomes one in vocational civics.

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PREFACE

This small book on occupations was begun as a series of write-ups for the vocational civics course in the Philadelphia Public Schools. It was intended both as a bit of vocational guidance for the boys and girls, many of whom would soon be leaving school for industrial and business life, and as a practical illustration of the possibilities of good citizenship in industry. But the few write-ups have gradually grown to three score and ten, and the book has finally been modified so as to be of general use and application.

The various occupations have been described by people in close touch with them, and, in the main, so simply that the pupil can easily understand the descriptions given. Both interest and enthusiasm have been put into these stories by the busy people who have stopped to write about their own vocations or avocations. And it is hoped that this may arouse a corresponding interest and enthusiasm in the boys and girls who read the stories, and help to draw them vocationally in the direction nature has indicated for them to go.

It is not intended that the teacher should have the pupils study the occupations in the order given in this book. She may wish to take up first those occupations with which the children of her class are most familiar, or perhaps alternate those for boys with those primarily for girls. The children most interested in the occupation being studied or about to be studied will be eager to report to the class and may be able to bring in tools, pictures, and samples of materials. Trips for the purpose of observing some of the occupations should be arranged after the text has been studied.

The editor of *Getting a Living* hereby gratefully acknowledges his indebtedness to those busy men and women without whose generous aid the book as planned could not have been realized. The writers have taken precious moments to contribute from their personal experiences to the vocational needs of our boys and girls. Yet the work was undertaken willingly, often enthusiastically, in the belief that it might prove an inspiration and guide to the young school-citizens who are so soon to be work-citizens. Grateful thanks are especially due to Miss Ada F. Liveright, Mr. J. Wesley Foote, and Mr. Holman White for assistance in compiling this work.

The names of the contributors follow, with humble apology to any whom we may have missed, inadvertently.

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INTRODUCTION

CHOOSING A CAREER

You boys and girls have reached the time in your school life when you should begin to think about what you are going to do when you leave school and become soldiers in the great army of workers. In a few years you will be called upon, as citizens of this great country of ours, to take the places of your fathers and mothers, older sisters and brothers, and carry on the work of the world. The answer you give to the question, "What am I going to do?" and the manner in which you prepare yourselves for your chosen work will greatly increase or diminish your chances of success and happiness.

During the past few years you have heard much about the importance of "Preparedness"—how necessary it is that a nation should be prepared to defend itself; that is, it should prepare for war in time of peace. Well, it is just as important for you to prepare while in school—which is your time of peace—to fight the battles of life, as it is for the United States to prepare to fight its battles.

When a boy enlists in the Army he must first decide which branch of the service he wishes to enter, whether it is to be the infantry, artillery, cavalry, engineering corps, or aviation. Now the army of workers in which you are so soon to enlist is also made up of many different branches of service, and it is just as essential that you should choose the branch of service you wish to enter in this army as it would be if you were enlisting in the regular army.

Your selection should be influenced by three things:

1. What you would really like to do.
2. What your natural abilities and talents best fit you to do.
3. What your parents and teachers advise you to do.

This matter of choosing your trade or profession is, like all other important questions, rather difficult to decide. In fact, it is so hard to answer that many boys and girls give it up and leave it to chance, taking the first job that is offered without making any special preparation and without even knowing whether they will like the work or whether they really want to do it. They only wish to get away from school as soon as possible and start earning money. Sometimes this plan works well; but more often the boy drifts from one job to another either because he does not like the work or because he has not had the proper training and not enough schooling. So he goes from place to place, until the day when he realizes that he is a full grown man who has missed his calling. He knows a little of many things, but can do no one thing well. He sees the boys who remained longer in school passing him and holding positions of responsibility in the trades or professions they selected while yet in school. He realizes then, when it is too late, the great mistake he made in starting to work without adequate preparation and without first knowing just what he wanted to do.

Many boys and girls and college students work during the summer months at the trade, occupation, or profession they have decided to follow in order to get a clearer idea of the amount of education and training they will need to reach the highest positions of their chosen work. This often convinces a boy or girl of the need for remaining in school much longer than he or she otherwise would.

In order that you may begin to know what is being done in the world about you, the following stories of occupations have been written by people who are actually doing the things themselves or who are in close touch with those who are doing them. We hope that they may help you to choose your occupation, and to understand the other occupations which will supply your various wants as long as you live.

I. INDUSTRIAL

THE BUILDING TRADES

MAN'S most urgent need, after food, is shelter. Most animals have the instinct of building; the birds have their nests and the wild beasts their holes and their dens. But man is the true builder. From the earliest times his first care has been to build for himself some kind of house to shelter him from the weather and protect him from his enemies.

Thousands of years ago men dwelt in caves or holes in the rocks. Later some of them learned to make tents of skins, while others tried to erect huts of stone or earth which would be more permanent. They piled up stones into rude walls and made a roof of some kind over them. Step by step they learned to build a firm foundation, to improve the roof, and to form doors and openings for light and air.

As civilization advanced, however, houses became more elaborate. It is a long way indeed from man's first crude dwelling to the beautiful modern home with its stairways, its decorated walls, its doors and windows fitted with glass, its plumbing system carrying water to all parts of the house and disposing of wastes, its heating plant, its arrangements for lighting, etc. In the earliest times each man built his own house in its entirety, but since house building has become so complicated many different workmen are employed, each with his own special task to perform. Since everyone must have a dwelling of some kind, the building trades have become one of the most important groups of occupations for man.

A great many operations are involved in the construction of a house. First of all the architect must prepare plans and make blue prints to guide the builders. Then the cellar must be dug and the foundation laid. This is done largely by unskilled laborers. If the house is built on firm ground it is usually sufficient to cover the floor of the cellar with cement and line the walls with stone. If the ground is swampy or marshy, or if the building is very heavy, a firmer foundation must be laid. For the heavy steel buildings, called "sky-scrapers," long pointed logs called piles are driven deep into the ground, below the cellar, and a floor is built of steel rails filled in with concrete upon which the whole structure rests.

As soon as the foundation is completed the walls of the house are built. This is work for the carpenter, the stonemason, or the bricklayer, according as the walls are made of wood, stone, or brick. The roof may be of shingles, tiles, slate, or even of metal. The work of roofing has become a separate occupation. Finishing the interior of the house is largely the job of the carpenter. He lays the floors, puts in the partitions between the rooms, and finishes the doors and windows. Stair building is a highly skilled form of carpentry, and is often done by special workmen, who receive higher wages than the ordinary carpenters. Before the inside walls are completed the pipes for the heating, the lighting, and the plumbing systems must be installed. This is the business of the plumber and pipe fitter. If the house is to be lighted by electricity the wiring is done by electricians.

When the inside walls have been built and covered with lath, and all the pipes have been properly installed and tested, the plasterer covers the walls and the paperhanger adds the final touches. The painter has the task of finishing the woodwork, both inside and outside. If it is a frame or shingle house the entire surface must be painted; if stone or brick, only the framework of the doors and windows and the wood mouldings and other finishings on the inside are painted. In the larger and more expensive houses an interior decorator is sometimes employed to decorate the walls and ceilings. His work is closely allied to that of the painter, but of a more highly skilled and artistic character.

More than 50,000 men and boys in the city of Philadelphia alone are employed in the various building trades. Of these, by far the largest number are carpenters and joiners. As a rule, the carpenter does the rougher kinds of work, such as the flooring and joisting, while the joiner does the more skilled work, such as the fitting of doors, window sashes, etc. The two go hand in hand, however, and the carpenter who would reach the top of his trade should have a knowledge of both. There is plenty of room for the boy who likes woodworking to earn a good living in this trade, as the pay is good and there is a demand for reliable workmen at all times of the year.

One of the most highly skilled of the building trades is that of the bricklayer. It might seem as if the building of a wall by laying one brick on top of another required no great knowledge or skill, but such is not the case. The workman should know the quality of all the different kinds of bricks and the character of the mortar which is to be used. He should understand the construction of arches and corners, and know how to keep the walls straight and true. To learn all this thoroughly takes many years, but in the end the bricklayer is assured of a good trade which promises steady work for a large part of the year.

There is also a good field in the trades of plumbing and of gas and steam fitting. These are also highly skilled forms of work and require a long period of training or apprenticeship. The trades of the plasterer and the paperhanger are less highly skilled unless the worker becomes a skilled interior decorator in his line. That of the painter offers perhaps the highest possibilities of all, if the workman has artistic talent and decorative skill.

On the whole, the building trades offer excellent opportunities for the boy who likes to work with his hands and is interested in construction of any kind. An intelligent boy may enter one of the various trades at almost any time after he is fourteen years old, but he will have a far better chance if he can complete his course in the grammar school and take some special training in the trade he wishes to pursue.

Formerly, when a boy reached a certain age he was sent to learn a trade. He was placed under a master, for whom he worked for a very small sum of money; in many cases he worked for the experience alone. Such a boy was known as an apprentice. He had to serve his master many years before he could start in business for himself. Today the trades school takes the place of the apprentice system. Men in business do not want to spend any time in teaching trades to boys. Besides, in a trades school boys can save much time, get a better training at the trade, and have a better chance for advancement.

The wages of workers in all the building trades compare very favorably with those of most skilled mechanics, although it must be remembered that they rarely have employment more than nine months in the year. A good deal of the outside work is dependent on weather conditions, and frequent delays are necessary from this and other causes. The usual working day is eight hours, being somewhat shorter than in most manufacturing industries, and the conditions are more healthful than in many other lines of work.

ARCHITECTURAL DRAFTING

Have you ever stood and watched a high building being erected? It is interesting to see the elevator carry a man with a wheelbarrow of bricks or mortar to the upper floors and the steam or electric crane lift huge iron girders high in the air. But have you ever stopped to wonder how each man knows where to place each particular girder, brick, or stone? If you should speak to one of the foremen he might show you the plans (sometimes called blue-prints) which show him where and how each thing should be placed.

From earliest times to the present no building of any description, from a shed to a sky-scraper, has been built without a plan, be it merely an idea in the builder's mind, or elaborate drawings made by a large force of men. In modern building the architect plans every detail. He must show in his drawings exactly how the finished structure will look both within and without. He must indicate the kinds of material that should be used and the exact spot where each thing is to be placed. Everything must be so clear that any builder, by looking at the drawings (the plans) and reading the written instructions (the specifications), will know exactly what to do. At times the architect takes complete charge of the erection of the building.

In order to make the great number of plans required it is necessary for the architect to employ a number of men known as architectural draftsmen. From the architect's sketches they make the drawings or plans, and in some cases do original designing. A chief-draftsman is in charge of all the others in the drawing room and is considered the architect's "right-hand man."

To become an architectural draftsman a boy may enter an architect's office as an apprentice. At first he is given only general office work to do. In a short time he is put at making small tracings and other less important work. The difficulty of the work is gradually increased until, after several years' apprenticeship, he is qualified to become a draftsman. The apprentice is taught either by the architect himself or by the draftsmen, but, of course, they cannot find time to teach him all the history, theory, and mathematics necessary to master the trade. If he left school before he got this necessary foundation he must get these for himself in the evening, if he would reach the higher and more responsible positions in his chosen work.

Another method of learning to be an architectural draftsman is to enter a trades school. Here the beginner will be given practical work, as in an office, and will be well grounded in the principles underlying all kinds of architectural drafting. As a result of this he will be fitted to enter almost any office and will not be restricted in his choice of a field, as the draftsman who is apprenticed in one particular office may be. In the trades school he will also get an academic background which, with practical skill, will enable him to rise to the top.

Architectural drafting is pleasant, clean work. Drafting rooms are usually well lighted and well ventilated. The draftsman is not required to stand, nor does he stay indoors all the time, as he must often go out to sketch or take measurements.

There is an ever increasing demand for draftsmen. Even though the weather is unfit for building purposes, there is always need of draftsmen in designing and planning buildings. There are thousands of structures built yearly and each of them requires a certain number of draftsmen.

In architectural drafting there is no standard scale of wages and the draftsman is paid a regular weekly or monthly salary. The salaries vary with each office. Apprentices are generally paid very little until they become draftsmen, and then they are advanced rapidly. The salaries of chief draftsmen differ with the size of the drawing room.

There is no field which offers more opportunity for advancement. Many builders and architects who are earning large sums of money each year began as apprentices, earning almost nothing. Success depends upon the person himself. Industry, study, and application to the work are bound to bring advancement.

To be a successful draftsman one must possess patience. Great physical strength is not necessary, but one must have a clear, keen mind. The draftsman must be accurate and thoroughly grounded in mathematics and history. He must have a working knowledge of all building materials and should have a good general education.

Architecture is an art, and the architectural draftsman is recognized as a person of artistic ability. He comes in contact with intelligent and highly educated men, and for this reason should be well educated himself.

For the boys who take up the study of architectural drafting many other branches of work are made possible because of the knowledge they secure of the various trades. Many draftsmen have become high salaried estimators, successful salesmen of building and hardware specialites, specification writers, builders and contractors; and many former architectural draftsmen are now famous illustrators and authors. With the girls the same thing applies, as many of the most successful interior decorators, furniture designers, illustrators, and writers owe their success to the fact that they studied architecture.

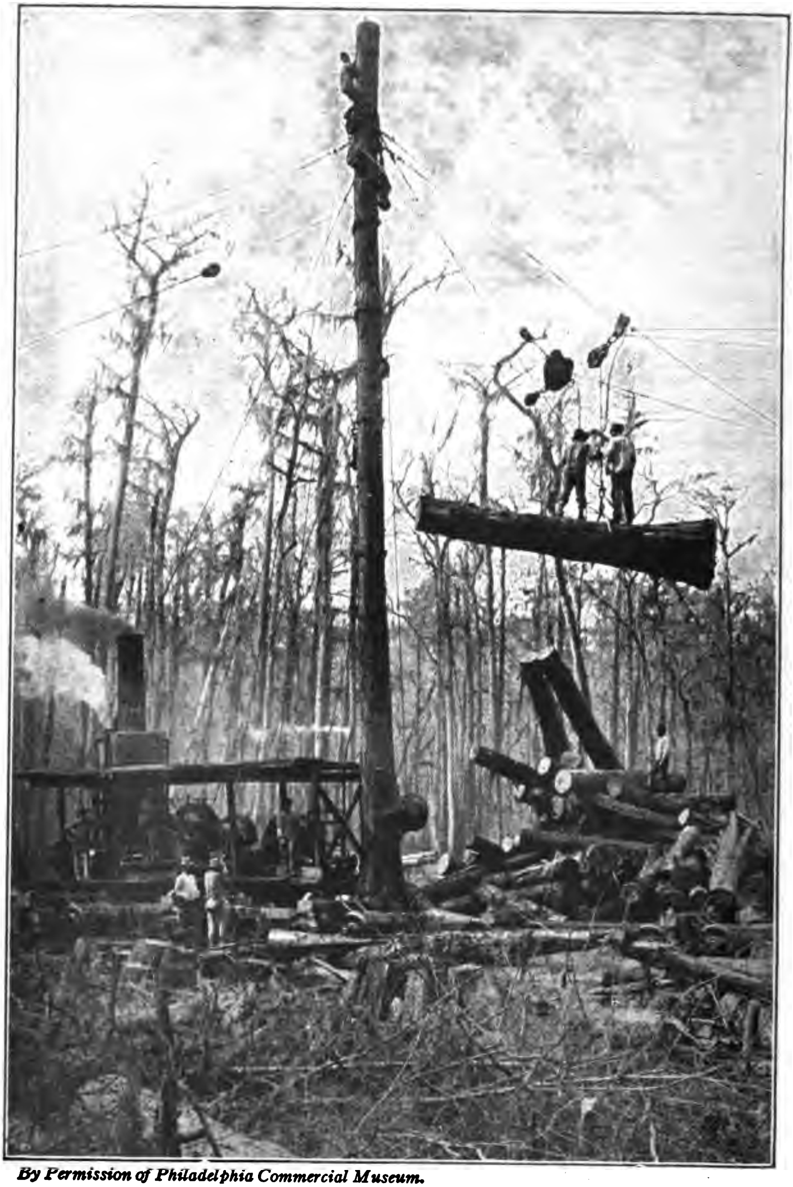
CARPENTRY

Nearly every boy likes to work with hammer, nails, and saw and many boys know how to use these tools quite skilfully. Such knowledge is the first step toward the mastery of carpentry.

Carpentry, to those who know it well, is the most interesting of occupations. Its interest is due to the many branches of the occupation, to the variety of work in each branch, and to the many opportunities for advancement.

To become a carpenter a boy may begin without having special preparation for the work. In such a case he may apply to a builder or contractor and begin as an apprentice. He learns gradually, by observing the methods of the skilled workmen about him. The beginner's first tools are the hatchet and the saw, and his first work is the rough work. Even as a learner in this unskilled work he is of use to his employer. If he is ambitious and intelligent he proceeds gradually to the finer work, and after three or four years of apprenticeship becomes known as a skilled mechanic. If he is industrious and alert during his training period he will learn to read the plans and specifications of buildings, and will gradually acquire a knowledge of all the processes of wood construction.

This way of learning a trade is sometimes very discouraging, as there is really no one whose duty it is to give the beginner his training. All must depend upon the patience and good will of the surrounding workmen, and the intelligence and willingness of the boy. Very often an apprentice will go to an evening school to study certain phases of his work and to get a better



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These Great Logs Make Boards for the Carpenters.

education, for he soon sees that the better educated men have the better chance for advancement. If a beginner is indifferent or unintelligent in his way of taking up carpentry he is not likely to get beyond the stage of rough or outside work. In some localities he is called a "hatchet and saw man." His work requires no particular skill, and in normal times his days of employment are comparatively few.

A boy who wishes to have the advantage of instruction in carpentry may take a course at a trades school. During that time he is drilled in the uses of many tools, he receives definite instruction in practical carpentry and a general education which will make him more valuable as a workman. After such training he will get at least twice as much pay from a contractor as the untrained beginner receives. He is also likely to advance more rapidly in his trade. The skilled carpenter is the one who knows how to build from cellar to roof. He is the one upon whom the responsibility of the building rests; masons, plumbers, and all others working on the building take their lines from him. He is the one who becomes foreman of a building. If he keeps on advancing he becomes superintendent of large building operations, where hundreds of workmen are employed.

In addition to the opportunities for advancement the carpenter has the advantage of working under healthful conditions. He has plenty of exercise, plenty of fresh air, and is seldom subjected to any dangers. The fact that he begins to earn money rather early in life is also considered an advantage. He claims that this enables him to earn much more in a lifetime than the professional man. But the wise boy knows that no matter what occupation he chooses every added year of schooling will bring him greater success in his work and greater happiness in life.

The carpenters' unions regulate the hours and wages. They allow an eight hour day and fix a minimum wage for which union carpenters may work. In this trade, as in others, good workers are always in demand.

CONCRETE

A. CONCRETE CONSTRUCTION

Just as your mother pours gelatine into a mold, so it is possible to mix material, pour it into a mold in the shape of a building, remove the mold, and the building is ready for the glass windows and finishings. Only a few years ago no one believed this possible. Now a whole group of new occupations has grown up around concrete construction.

Concrete has come to be used for a great variety of building purposes. Made and handled in rather crude fashion by the ancient Egyptians, developed by the Romans and in recent times by America and the nations of western Europe, concrete has reached a stage of development where it is successfully employed in great bridges, lofty sky scrapers, and massive dams; in aqueducts, sewer systems, and irrigation canals; in city pavements and country highways; in houses, barns, store-houses, and silos; and, perhaps the greatest wonder of all, for the hulls of ocean-going steamships.

The increasing popularity of concrete marks the advance of civilization with its demands for greater cleanliness, better sanitation, and more protection against fire. The supply of concrete is inexhaustible because it is principally the product of natural stone, boundless quantities of which are distributed throughout the length and breadth of the land.

Rapid introduction of concrete has kept the demand for skilled concrete workers well in advance of the supply, and this condition seems bound to continue indefinitely. The occupations in the industry of concrete construction, listed in the order of their importance, are about as follows: engineer and architect, superintendent, inspectors, foremen, finishers, form builders, reinforcing placers, mixing operators, and laborers. Many concrete products are made in factories. The occupations here are: manager, foremen, modelers, pattern makers, plaster and glue mold makers, and machine operators.

Engineer and Architect.—In structural work the man in charge is usually a civil engineer or architect who has specialized during his course of training in structural or reinforced concrete engineering and design. In road building the engineer in charge has probably specialized during his training period in highway construction. In either structural or highway work he is the designer or creator of the proposed structure. The nature of the work and the kind of training necessary for this kind of work are discussed under Engineering and Architecture among the professional occupations in this book.

Superintendent.—After the engineer or architect has designed a structure he usually places it in the hands of some competent contracting firm for construction. The contractor's representative in charge of the job is the superintendent.

A successful superintendent must have resourcefulness, technical knowledge, tact, energy, honesty, and judgment. He must possess a strong personality, power to organize a group of men who are without special interest in the work or in the results to be accomplished, good judgment, and great enthusiasm for the work at hand. It is his problem to build a structure the design of which may have troubled the engineer or architect to show clearly on paper. He must be honest, since the company leaves its reputation in his hands and trusts him with funds. He must, through education and experience, be so trained that dangerous operations are carried on as a matter of routine, without worry either to himself or to his company. He must have ability to foresee and provide for the problems which are perhaps to come up months later. He should have his temper continually under control, even under the most provoking circumstances. He should have as much pride in the structure he is erecting as the engineer or architect who designed it. He must be able to handle labor, and to cope with the various labor problems that may arise.

This detailed account of the qualifications of a superintendent of concrete construction is given because practically the same qualifications are necessary for superintendents of factories, stores, and many other lines of business activity. This is also true of the accounts given below of the work of the inspector and foreman. The training for these positions, of course, varies with different lines of work, some requiring great technical skill, while others require only the ability to handle men.

The superintendent's training includes technical education and experience. Usually he has served in various capacities with the same or other firms of contractors, and has reached his present position through hard work and study. If he is a man of extraordinary ability he may have worked up from the ranks by hard work, home study, and night school training, but without a high or trade school training he is greatly handicapped.

On some of the larger jobs the superintendent has an assistant. His duties are largely dependent on the man under whose direction he may work. In the capacity of assistant superintendent a man possesses excellent opportunity for advancement, and by study and careful attention to his work he may attain the position of superintendent.

Inspector.—As a usual thing, the designer of a large structure or highway places as his representative on the job an inspector, whose duty it is to see that the engineer's plans and specifications are properly carried out. His duties are not difficult, but it takes a man who treats the workmen with consideration, and at the same time is firm to safeguard his employer's interests and make sure that every part of the work is performed in a thoroughly acceptable manner. The inspector must be thoroughly acquainted with every feature of the construction work. His training must be much the same as that for the engineer and for the architect or superintendent. In fact, a position as inspector is often the stepping-stone to something better.

Foreman.—On large construction jobs there will be several foremen, each in charge of a particular phase of the work.

First and most important, the foreman must be able to handle men. His duties are more than just to "hire and fire." He must be acquainted with the problems of his men, and spend some time in studying their viewpoint on all questions in which they may be interested. As is often the case, he is a man who has advanced from the ranks and will no doubt be in a position to see the men's side of various questions; but he must be fair minded, and not see the men's viewpoint to the exclusion of his employer's interest. It is necessary that he weigh carefully any situation, making a fair and just decision.

The foreman must be able to read plans and put them into operation. He may not be called upon to perform actual mechanical operations, but should be able to show and teach the men how the work should be done. He is, in fact, the superintendent's right-hand man on the particular phase of the work which has been assigned to him.

Most foremen gain their position through hard work, experience, and study. Evening schools have been started in a large number of cities which are giving courses in concrete construction, particularly for the concrete worker who is anxious to better his position. The boy or girl still in school cannot realize how difficult it is to attend evening school classes and study after a full day's work, therefore you should continue in school as long as possible.

Finisher.—The repairing of imperfections of concrete surfaces, and the finishing or floating of flat surfaces, require the work of the finisher. He must possess manual dexterity, so that he can handle skilfully a float or a trowel, and must know when a surface has been worked sufficiently. Usually the finisher receives his training on the job.

Form Builder.—Little need be said regarding the work of the form builder, except that he usually possesses the experience and training required for carpenters. Some forms are made of sheet metal and are simply fastened together.

Reinforcing Placer.—Reinforcing placers are often laborers under the direction of a skilled foreman. Their duties are to place the reinforcing steel according to specifications prepared by the engineer.

Mixing Operator.—Several things of importance are required of the man who operates the concrete mixer. He must have some mechanical skill in order to operate and take care of a steam or gas engine or an electric motor. He should be able to repair the mixer in case of a breakdown. He must also know something of the proportions and character of different concrete mixtures under varying conditions.

B. CONCRETE PRODUCTS MANUFACTURE

The manufacture of concrete products presents a business opportunity which is rapidly gaining in importance. Today the manufacture of concrete brick, block, tile, sewer and pressure pipe, silo staves, trim stone, lamp posts, fence posts, burial vaults, garden furniture, roofing and floor tile, and a number of other things is being carried out in well-equipped plants. This industry is coming into a position of dignity and importance, and is requiring men who are especially trained and skilled. This line of work presents a wonderful opportunity for the man who some day plans to go into business for himself. The amount of capital required to start a plant is comparatively small. However, before entering the business careful study must be made of the manufacture and marketing of concrete products.

Manager.—In large products plants a manager is employed by the company, while in smaller plants the proprietor usually acts in that capacity. The man who undertakes the management of an enterprise of this kind should understand business principles and have training and experience in business life. He must be familiar with the requirements of the products which he is manufacturing and should possess a knowledge of selling and advertising.

Foreman.—The foreman is in active charge of the manufacturing of the products and has direct charge of the labor employed. His requirements are much the same as those mentioned for foremen on structural or highway work.

Machine Operator.—A large percentage of concrete products are manufactured in specially designed machines, which require some skill in operating. A machine operator usually gains his training in the plant.

Modeler.—The manufacture of some ornamental work requires the services of a modeler. To produce many products of artistic design requires the service of a man trained in an art school. It is his duty to produce the full sized object in clay or some other plastic substance. From his model plaster or glue molds are made in which the concrete is placed, thus reproducing in a permanent material an exact duplicate of his model.

Pattern Maker.—Some forms of ornamental work and trim stone require specially made wooden molds. To make these molds requires the services of a pattern maker. A pattern maker is usually trained in a wood working shop or trades school.

Plaster and Glue Mold Maker.—Plaster and glue mold makers must take the model provided by the modeler and make with plaster or glue a mold in which the concrete may be placed. Their training is gathered from actual experience with the material, under the direction of a competent foreman. This operation requires some mechanical ability and knowledge of the properties of plaster and glue.

SUMMARY

To the boy who is interested in construction work the field of concrete presents a life's work which is full of wonderful possibilities. The work is vitally interesting and alive. It should be borne in mind that while the minor positions can, through study and hard work, be made stepping-stones to the higher positions, progress is much more rapid and easier for the boy with more schooling. The industry is large, and there are opportunities for everyone to whom the doing of big things appeals.

BRICKLAYING AND MASONRY

The art of bricklaying and masonry is one of the oldest known to the human race. The earliest evidences of stone masonry still preserved are found in the ruins of the ancient Egyptian and Hindu temples. The Great Pyramids of Egypt, erected between 4000 B. C. and 2500 B. C., are striking evidences of the marvelous perfection of the ancients in this art, while the best preserved piece of historic brickwork is the Great Wall of China built in the third century B. C. The mason of ancient times was the most highly honored and esteemed of all workmen. Down through the ages masonry has played an important part in the construction of buildings, bridges, temples, cathedrals, and like products of mechanical skill. Only recently has the use of concrete, which is another branch of masonry, begun to take the place of brick and stone.

Bricklaying and masonry mean far more than the mere laying of one stone or brick upon another with a layer of mortar between them. It requires an expert workman with brain and body trained for this art. A bricklayer or mason must be able to lay his material plumb and level, know how to carry up a wall according to blue prints and specifications, and be able to use just the right amount of mortar between the bricks or stones.

There are two sides to masonry: that which is known as rough work, which includes the laying of the foundation or rough party walls, and finished work, which consists of the different styles or bonds in which bricks or stones may be laid. The latter, of course, requires the greater skill. The erection of a chimney is regarded as requiring the greatest skill in the bricklayer's art. A bricklayer is expected to "tie" the walls to each floor by building them into the necessary anchor rods.

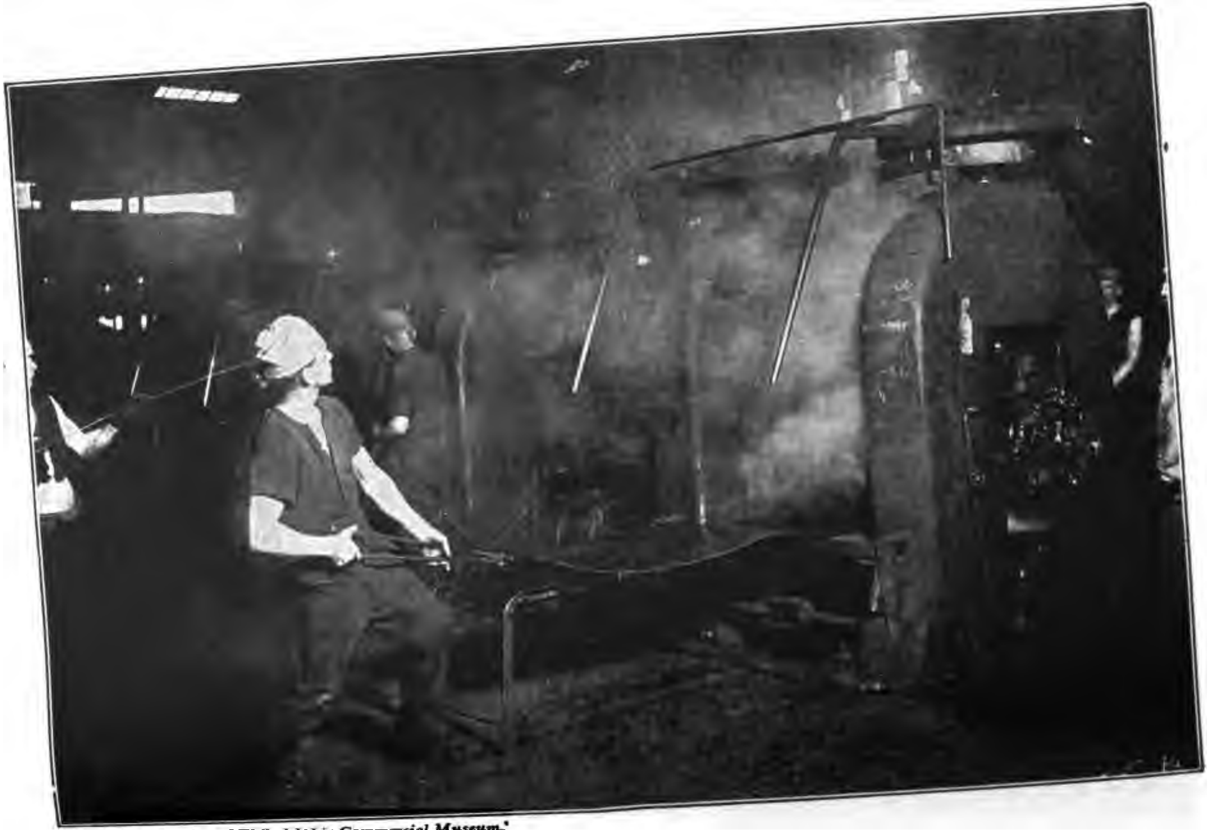
Brickwork was introduced into America in the seventeenth century, the first brick buildings being erected on Manhattan Island. This industry is unique in that so far the workers have not had to compete with machinery or with foreign manufacture. Needless to say, accuracy is a prime essential in this trade. In practically all building operations when blocks of stone already shaped and numbered reach the building site they are sorted and stacked, in the order in which they are to be used, on a temporary platform erected for this purpose. As fast as needed in construction work the stones are lifted by means of a derrick, and the work of the stone-mason lies in assembling the blocks in their proper places with accurate joinings and secure fastenings.

To become proficient the future artisan should apprentice himself for a period of from three to four years or else attend a trades school. A higher education is not essential for this occupation, as it requires more muscular power than mental training. Technical training, however, leads to positions higher up. The apprentice has the advantage of obtaining first-hand information and experience while at work, but it takes years for him to learn as much about the trade as can be obtained quickly in a good trades school course.

The average mason is a strong, rugged man, who likes the outdoors and who has been hardened to the work and the weather. A dangerous task sometimes confronts the stone-mason in the adjustment of capstones to the towers of high buildings, but safeguards are taken to minimize all such dangers and accidents are few, as the law requires that all mechanics be protected.

Employment is seasonal, as there are always two or three cold months in which it is impossible to work. The bricklayer or mason is employed, therefore, nine or ten months in every year. He works eight hours a day and five and one-half days a week. This trade commands good wages, the bricklayer receiving a somewhat higher wage than the stone-mason. There are certain kinds of bricklaying that require added skill and training, such as tunnel, arch, and chimney building. This work is more highly paid than that of ordinary bricklaying.

Like all other positions in life, opportunities for advance-



By Permission of Philadelphia Commercial Museum.

Hot Rolling Steel Plates.

ment depend upon the natural ability and skill of the workman. If the mason is ambitious he has a chance to become foreman on large operations, or to become a builder. He must be accurate, obedient, patient, coöperative, and always open to suggestions in regard to his work. He must possess a strong constitution and be able to endure the fatigue and exposure to which he is constantly subjected. His personal appearance is not of as much importance as in some other lines of work, and he is generally engaged for the amount and character of work he can accomplish.

Men who specialize in brick and stone work are an absolute necessity in any organized community. The many beautiful styles of architecture found all over the world may be the result of the creative genius of famous architects and builders, but their visions would have failed of realization had they not been worked out through the mechanical skill of the mason.

THE STEEL INDUSTRY

The following vivid description of the many, many uses to which steel is put, in this twentieth century, is taken from a personal letter written by the superintendent of a big steel mill to the publishers of this book.

". . . From my rising in the morning to retiring in the evening the thought of steel is ever present. The alarm clock, revolving its shafts of steel, sets off the steel jingling of its bell and sends me to the bath-room. There, after my bath, I (sometimes) use my steel nail file and manicure scissors. Then, having clothed myself, I put on my steel nailed shoes, go to my breakfast, and knife and fork of plated steel are awaiting me. As I feed the inner man I read the daily paper—product of the wonderful steel linotype and steel rotary press.

"Taking up my steel lunch-box, with its contents in steel trays and its steel-covered thermos bottle, I drive in a steel automobile to a steel plant to supervise the making of steel rails. All around me is steel machinery, steam engines, boilers, rolls, straightening machines, motors, presses, fans, and gears of all types and sizes—and all of steel.

"Sitting in an office heated by a steel gas stove, gas that flows through hundreds of miles of steel pipe, I take up my steel pen and write this letter.

"I think of the universal use of steel and its all importance in world economics. From the Atlantic to the Pacific, from the lakes to the gulf the entire country is intercrossed by a fine network of steel rails joined by steel angle bars and bolts and spiked to the ties with steel.

"Traveling thereon in endless succession are countless numbers of steel locomotives and steel cars loaded with food and clothing and all the necessities and luxuries of mankind. To stop them for a day would be a calamity; for a week, would spell starvation.

"The construction of these roadbeds would have been impossible without steel. Steel picks and shovels made the cuts and fills, steel bridges spanned the streams, steel chisels and hammers smoothed the rough ashlars for the mason work, steel drills pierced the stone frame of the great mountains and drove the tunnel through.

"Steel ploughshares furrow the plain and prepare the soil for the smoothing steel harrows. Steel drills plant the grain and at harvest time steel harvesters and steel threshing machines gather the wheat for the great mills whose steel roller process manufactures flour for our daily bread. From plow to table knife every step of food growth and manufacture is built of steel.

"In the cities steel frame skyscrapers are filled with steel fixtures, steel doors, hinges, locks, desks, gas and water pipes, chandeliers, safes, sash chains, keys, furnaces, elevators, and steel furniture. Look where we will, we see steel, steel, steel on every side.

"The story of the production and manufacture of steel, properly told, is a fairy tale.

"The dull red ore, torn from its bed in the Lake region by steel steam shovels, is loaded on the cars and afterward dumped by train loads into the cavernous depths of the steel whalebacks and carried to Detroit, Cleveland, or Buffalo, and from there reshipped to the blast furnaces.

"Into these furnaces the ore is dumped, heated, cleaned of dross with lime and other slag-gathering materials; alloyed with silicon, carbon, manganese, nickle, and splashed and dashed around in a molten mass, and then discharged into the ingot molds to form and cool.

"The mighty strippers lift the billets from the mold and they are taken to the slab mill for reduction to merchantable sizes.

"Heated to glaring white in a 2500° F. furnace the billets are roughed and then run through the finishing rolls, forming rails or sheets or bars, or slender miles of wire, as the orders read.

"These products supply innumerable factories, which, in turn, supply us with a million articles for daily use.

"In the steel industries there is an insatiable demand for red-blooded men of every class and qualification: chemists, construction men, production men, managers, clerks, mill hands, laborers, every conceivable class and kind. Every man can get a trial and no applicant is kept long waiting."

The boys and girls who read this chapter will hardly need to be reminded that, while the hours are long and the work is hard, there is every sort of opportunity for alert, ambitious young people. However, they must keep in mind that the prizes in the business will go to those who have been willing to take time enough in school and in specialized training to fit themselves for promotion to positions of trust and responsibility.

PLUMBING

The plumber's trade is not a new one, for traces of his work are found in the ruins of old cities. In ancient Rome the method of conducting water to the homes and public baths was particularly ingenious. At first all the pipes used were made of either wood or earthenware, but as pressure was introduced to force the water it was found necessary to substitute pipes made of lead such as are still in use.

Plumbing may be defined roughly as the business of installing in our streets and buildings the necessary pipes and fittings by means of which we obtain our supply of pure water and dispose of the waste water. The term, however, also covers gas fitting, steam heating, and hot water heating. Heater and range work used to be included, but is now considered a separate trade.

The boy who wishes to enter this trade should have at least an elementary school education, and should be willing to begin at the bottom and work his way up through all the different activities so that when he becomes a full-fledged journeyman he will know all the branches of his trade. The best thing for him to do is to apprentice himself to a good general plumber. He will not get such good wages as he could get from a man who takes contracts for large building operations, and his work will probably be harder, but he will learn the trade in all its phases instead of doing one part of it over and over again and knowing nothing about the other parts.

An apprentice begins by going out with the journeymen, carrying their tools and materials, waiting on them and helping them in every possible way. He is expected to keep his eyes open and to learn by close observation how to do things for himself. He will have to do such work for a year or more; but in the meantime, if he is the right kind of boy, he will be experimenting for himself in the shop in using the soldering iron and so learning the most difficult part of his job, the art of working in lead and copper. As his knowledge and skill grow he is allowed to do more and more of the actual work, until at the end of four years, if he has made the best use of his opportunities, he should be able to fit and repair gas, water, and soil pipes, to make the proper connections with mains and sewers, and to install heating plants and sanitary apparatus, as well as apparatus for protection against fire in houses and other buildings.

As in all other trades, advancement depends on the individual himself. He must be patient, because his job will often be accomplished only as the result of slow and tedious work; he must be accurate, for an error in his calculation may mean the loss of thousands of dollars; he must keep up with the times, as methods of work are always changing. The chances for advancement are good. Skilled workmen are always in demand and are paid a generous wage.

The work is fairly steady all the year round. It cannot be called an unhealthful trade, though when work is to be done in sewers and ditches the men are sometimes compelled to inhale noxious gasses. The work is often heavy, therefore boys of robust health and good physique are best adapted to it; but as the union requires an eight hour day the men are rarely overworked.

In the plumbing trade, as in every other walk of life, a man will find education an important asset. Practical knowledge is indispensable, but if he wishes to rise above the grade of journeyman he must be able to bring a trained intelligence to bear upon his work. He must be able not only to do the work himself, but to direct others. If he aspires to conduct his own business he must be able to estimate accurately the time and material required to complete a job, so that he may compete with other firms in bidding for contracts. As it does not require much capital to establish a plumber in business, nothing but the lack of such ability keeps many men from becoming their own masters.

The growth of knowledge in regard to the manner in which disease germs are fostered and spread has led to a greater interest in sanitation, and this has resulted in an increased attention to the plumber and his work. We have come to realize that the best plumbing we can obtain is not a luxury, but a necessity, and that anything else is a serious menace to the general welfare of the community. Many cities and states have laws prohibiting anyone from conducting a plumbing business who is not registered as having passed certain requirements. If he fails to do his work as required by the health and sanitation laws he may be deprived of his license. Such an attitude on the part of the public has had no uncertain effect upon the trade, so that today there is a great demand for men who not only understand the practical side of the work, but can bring scientific knowledge to bear upon it from the theoretical side.

ELECTRICITY

Electricity has always existed, but it was not until the eighteenth century that we knew how to produce it. Since then we have learned so much about it that today it may well be ranked as one of the greatest contributors to civilization. Although the last to enter the list of trades, the electrician may now be said to stand close to the head of the list in the value of his services to man.

Electricity is a wonderful medium through which we have been able to conquer darkness with the electric light and to bridge distance by the telegraph, telephone, and wireless. It has largely taken the place of steam as the motive power in factories, in running our trolley-cars, and to some extent in operating locomotives, thus doing away with much of the smoke nuisance and helping to make our cities cleaner and more healthful. It has completely changed methods of warfare by making possible the modern battleship, the submarine, and the aëroplane. Not only is it used in the business world, but in the home it can be applied to the simple domestic tasks of sewing, washing, ironing, and cooking, as well as lighting and heating. In this way the amount of labor necessary for the accomplishment of these tasks has been considerably lessened at a comparatively slight increase in expense.

An industry which touches so many sides of life must naturally give rise to many occupations, varying greatly in the amount of skill required of those who engage in them and in the scale of wages which they command. At the head of the list stands the electrical engineer, who must have a college education along the lines of his profession, including among other subjects mathematics, physics, and chemistry. Under him come a host of other engineers of specialized branches, station superintendents, designers, draftsmen, linemen, and others employed around the power houses.

From the power house radiate the other occupations growing out of this industry, the men who install the plants, wire the houses, and operate the switchboards, wireless apparatus, telegraph apparatus, telephones, etc. The use of electrical appliances on automobiles and trucks has given rise to an occupation in itself, which requires skilled mechanics along that special line.

Nearly all installation of electric light or power is made through contract. In this work there are two kinds of contractors, those who specialize in one branch of installation and those who do all kinds of wiring and repairing. A contracting company employs as many gangs of electricians as it needs. Each gang is composed of an electrician and his helper, or, if the job is a large one, of two electricians and their helpers. These gangs are put on the work they are best fitted for, such as operation wiring, old house wiring, factory installation, or repair work.

The electrical trades are fairly free from danger and are nearly all carried on under healthful conditions. Most of the accidents which occur can be traced to carelessness on the part of the men themselves. The employment is regular and the wage scale for an eight hour day, which the union demands, is quite as generous as that of any other trade, and in some instances better.

In no line of business is there more room at the top, so the chances for advancement are good. As many of the large electrical concerns recognize the value of scientific knowledge, education is a very necessary factor in advancement. Preference is usually given to college graduates who have the absolute requisites of honesty, steady application, and an accurate as well as a live mind. Any boy with these qualifications, especially if they are supplemented by a course in a good trades school, has a fair chance of getting to the top even though he may not be a college man.

The electrical business is in its infancy, and so affords a special interest and opportunity to men who are of an inventive turn of mind as well as to those who love adventure and enterprise. To such men it furnishes a stimulus by continually offering something new and unexpected.

PAINTING

When paint first came into common use the preparation of the materials was a long, tedious process, and required a lengthy apprenticeship. But thanks to the discoveries of modern chemistry and to the use of machinery, the task has been very much simplified.

Paint is made by combining various vegetable or mineral oils with "pigments," or coloring matter.. This coloring matter is made from minerals, bones, gums, resins, and animal and vegetable life. When these are mixed we have paints, varnishes, lacquers, etc.

Painting is divided into a number of fairly distinct occupations, though two or more of them may be followed by the same person. For convenience, we might divide the trade as follows: plain painting; graining; marbleizing; staining and hardwood finishing; enameling, varnishing, and lacquering; striping; lettering; frescoing and decorating.

Painting itself requires considerable knowledge and skill, and is the foundation for success in all the other branches of the trade.

Graining is the art of imitating the growth of different species of woods. It is used especially in the building trades. In the moderately priced house the interior woodwork and perhaps the furniture are grained to represent oak or some other hard wood. In the modern office building the steel windows, doors, and furniture are often finished so as to represent the finest and most expensive woods. When well executed an expert is needed to tell which is graining and which is real wood.

Marbleizing is similar in character to graining, and is the art of imitating various marbles. It requires the same amount of skill as graining, and the two are generally done by the same person. The results that can be obtained by both these processes are astonishing when done by one who is skilled in the trade.

Staining and *hardwood finishing* are usually applied to woodwork and furniture where hard wood has been used, and where it is desired to deepen or enrich the color of that wood and to bring out its natural grain. Staining is used even with leather, coarse cloth, etc.

Varnishing and *lacquering* require considerable experience, as varnishes are not at all alike and much skill and care is required in their application. Without this, the varnish when put on will be found full of specks or bubbles, and uneven and unsightly in appearance.

Striping in the building trades is used to represent the mortar between the bricks or between the blocks of stone, and to imitate marble and granite. Striping is also applied to wagons, automobiles, and safes. Here the men who do the plain painting usually do also the coloring, striping, and varnishing.

Lettering is an art, and practically in a class by itself. It has been specialized into several distinct branches, such as sign painting, wagon lettering, posters, book work, and designs for the printer.

Frescoing and *decorating* require artistic skill and ability in a high degree. They may change our walls and ceilings into a fairy land of scrolls, brocaded borders, flowers, cupids, and even landscapes.

We see, therefore, that "painting" is broad in its scope and has opportunities for advancement that lead up to high degrees of art. It is a necessary work, full of interesting processes and always appealing to the earnest man. Moreover, the demand for good workers in all branches of the trade is steady, and the pay compares favorably with that in other trades that require a like degree of skill. Personal appearance, good manners, good morals, and right thinking are necessary to success in business or trade, and painting is no exception to the rule.

During recent years the apprentice, or learner, has been sadly neglected by most masters, and the outcome is that this trade, as well as others, lacks men of skill. The best and most profitable way for a boy to learn the trade after having received a good common school education is to take the course in a trades school, where he will get a good foundation for the work he has chosen as a vocation. The trades school will open many new channels of thought and give him more opportunities of varied experience than he would obtain in a shop. Many workmen today have been handicapped for lack of enough school education. Modern methods demand a good general education, followed by years of special training, if one would become a master of his trade.

PAPER-HANGING

When the paper on the walls of our homes becomes worn, soiled, or discolored we send for a paper-hanger. It seems to us an easy task as we watch him put the paste on the paper and flatten the long strips on the wall with his big soft brush; but it is not easy, for, like all other worth-while trades, it requires skill.

A boy who wishes to become a paper-hanger goes first into one of the paper-hanging shops. Here he learns the rudiments of the trade, the names, qualities, and prices of different grades of paper, and the meaning of many terms used only in this business. In time he becomes thoroughly familiar with the stock. If he is going to be worth anything at all in this trade his value will begin to show in about a month. He soon becomes what is called a "junior stock boy" or a "junior assistant in the stock room." After sufficient training in one of these shops there are at least two avenues open to him. He may become a salesman in the decorative department of a big establishment, or he may go directly into the working end of the business. If he chooses the latter, and secures employment with a big concern, he again has a choice. He may become a wall-scraper, a paper-hanger, or a finisher and decorator. In small establishments, however, one man learns to do everything, to prepare the walls, hang the paper, and finish. Each of these requires special aptitude and skill. All branches are fairly free from danger.

Before a boy is given a chance to try his hand at paper-hanging he becomes an assistant to an experienced man. He has a few minor duties to perform and is told to keep his eyes open. The wide-awake boy learns quickly. If he is alert and active he sees how the wall is measured and how much paper to allow without unnecessary waste; notes how carefully and quickly the paper is cut out on the long, clean table; watches the manipulation of the brushes and the paste; and learns how to fold the paper back without soiling or tearing it as it is carried to the wall. He notices particularly the great care and deftness with which the paper is matched, how the corners are turned and the borders fitted, and finally, the neat, fresh, clean appearance of the finished wall. After several such experiences he has an opportunity to try a fairly easy job himself. If he is faithful in his attention to details, and neat and careful in all places, his inspector passes the work with a good criticism. With practice he becomes more proficient, and in time passes on into a higher branch of the work.

The highest branch of the work, interior decorating, requires men and women who know something of art. There are various kinds of decorating, some necessitating much skill, some little. But underlying all successful decorative work, whether it be paper-hanging or fresco painting, the decorator must have a natural inclination for the work, an eye for color, and a keen artistic sense. We are told that the work of a fresco painter is but one step removed from that of an artist.

There are two classes of workers, day workers and piece workers. All boys, when they begin in the shops, are day workers. At first they are given nothing important to do, as they are apprentices and have no knowledge of the trade.

Therefore, the good stock man must give much of his time to teaching the boy and correcting his errors. All day workers are paid extra, usually double, when they work overtime. Day work is not always so satisfactory to the wage earner as piece work, in which the amount and quality of the work done depend largely upon the individual. The piece worker is often called a "sub-contractor." The usual working day in this trade is eight hours, with Saturdays off.

There are two distinct busy seasons, when the work is very heavy and so extensive that the orders cannot be filled. In such cases it is necessary to put on extra, inexperienced help. To prevent this the energetic manager tries to bridge over his dull season by encouraging his customers to give him their work at times when it can receive the immediate attention of efficient workmen. Then, too, weather conditions must be considered. Entirely satisfactory work depends upon the elements to a great extent. During a long, damp, rainy period the walls and paper will not dry out thoroughly.

There is a fine field in the paper-hanging business for elementary school-boys who are neat and clean, not only in their work but in their personal appearance as well. Careless, slovenly men are not wanted in people's homes, nor are rude, impolite men desired. A paper-hanger, therefore, must be polite and gentlemanly, industrious, clean, and willing to obey orders. He should be so anxious to improve in his trade that he will be open to suggestion, and able to handle a difficult situation tactfully. There is great demand for such men, and as much opportunity for advancement as in many other walks of life.

WOOD WORKING

We have learned what an important part wood plays in the building of our houses, but we all know that it has a great many other uses. If we think of the chairs, desks, and tables, the boxes and barrels, the wagons, trolley-cars, and boats, the pencils, penholders, and matches which are in every-day use, we shall begin to realize how important our forests really are. It is said that the value of the wood cut in the United States each year is equal to that of all the iron, gold, and silver mined here in the same time. Let us see what takes place between the time the lumber is cut in the forest and the time when it comes into our homes in different forms.

Lumbering.—Most of our lumber camps are situated in the western part of the country, as the forests are thicker there and the trees much larger. In California some of the trees are as high as our tall sky-scrapers and as thick as the distance from floor to ceiling in any room. Although the trees in the eastern part of the country are much smaller, a great amount of timber is cut from eastern forests as well.

The trees are sawed or chopped down by the lumbermen, and dragged in sections through the woods to the railroad or the river. Sometimes they are loaded on freight cars and shipped to the mills, and sometimes they are bound together in great rafts and floated down the rivers. Thousands of men are employed in the numerous lumber camps which are scattered all over the country.

The work is healthful and agreeable, but requires great physical strength and a fondness for outdoor life. It is not considered as skilled labor, however, and does not offer a very high wage or any great opportunity for advancement.

After the logs leave the camps they go to the lumber mills. Here they are sawed into boards, and the boards are sawed into various shapes to make moldings, window-sashes, doors, and wood-work of all kinds, after which they are planed smooth. Practically all the work in a lumber mill is done by machinery, and all that the men do is to set the saws in motion by pressing levers at the proper time. The work is not highly skilled and is done largely by laborers, although it is supervised by experts who sometimes receive fairly high salaries.

Furniture-making.—By far the largest branch of the woodworking industry is the making of furniture. This is so large an industry that it offers a great variety of occupations.

As in the lumber mills, machinery is used for the greater part of the work done in furniture factories. The wood is cut into various forms by machines, and the turning and shaping is done by high-power lathes run by steam or electricity. Even a large part of the carving, finishing, and polishing is now done by machinery.

Although the introduction of machinery has reduced the number of skilled workers in the furniture trades, cabinet-making still offers a good field for the skilled mechanic. There is some handwork required in fitting the parts of the more elaborate pieces of furniture together and also in veneering, a process which is used in finishing much of our furniture. Some woods, such as mahogany and oak, are so valuable that only the most expensive pieces can be made entirely of them. Much of our mahogany furniture is made by cutting the mahogany into thin sheets and gluing it over cheaper wood so tightly that it looks as if the piece of furniture were made entirely of the expensive wood.

There are splendid opportunities for the skilled workman in the designing and making of exclusive and original furniture, in which no two pieces are exactly alike. The boy who is handy with tools and is interested in the various forms of wood working will therefore have a chance to reach a high degree of advancement if he enters the trade of cabinet-making. For this he can have no better preparation than a course in a trades school or the manual training course in a high school. If he is unable to complete either of these, he may enter the trade as an apprentice and continue his training in an evening school. One of the best ways for a young man to get a good general knowledge of the trade is to obtain a position in a shop which does repairing, where he will have a chance to assist in all the different processes which enter into the making of a piece of furniture.

OTHER MECHANICAL TRADES

THE MACHINIST'S TRADE

THE history of the progress of civilization is largely one of increased mastery over nature through the use of tools and machines. What formerly took many men a long time to accomplish by hand can now be done quickly by one man with the aid of machinery. The nineteenth century, in particular, produced so many inventions that it has been called the "Wonderful Century."

"Man is a tool-using animal," says Thomas Carlisle. The characteristic which most distinguishes man from the lower animals is his ability to make tools to do his work. What boy is there who does not like to see what his toy is like, inside as well as outside? It is said of the great Edison that he once annoyed his pet cat by looking down her throat to see what made her purr! It is this instinct that has given rise to the trade of the machinist.

The machinist of today must know how to use many kinds of tools, as well as how to make, repair, and sharpen them. Perhaps the first thing that a boy who wants to become a machinist must learn when he enters a machine shop is how to grind down the broken and dull tools on the emery wheel. He will next have to master the lathe, a machine which rotates the metal against the edge of the cutting tool. Of these there are many varieties, but all working on the same principle. After becoming familiar with the lathe he will work on the grind wheel, the drill press, and other similar tools.

When he has learned to operate these tools he is ready to learn tool-making. This includes punch and die work, which is the making of stamp-tools to be used for the production of special interchangeable parts of complicated machines, such as typewriters and adding machines. Jig and fixture work is the making of special apparatus used on drilling and milling machines for holding parts so that each will be machined as accurately as the others. Gauge making is the making of standard tools for measuring. When he has become expert the boy may be put to work making professional tools for dentists, doctors, and others.

The boy with a special fondness for using tools and making things, who has had at least two years in a high or technical school, will find a splendid opportunity in the machinist's trade. If he is active and alert, accurate, patient, and skilful he can learn his trade quickly and secure promotion; if he combines these qualities with study outside of his daily work he can secure a position equal to that in any of the professions.

The wages paid in the machinist's trade depend on the mechanic's ability. His working day varies from eight to ten hours.

SHEET METAL WORK

Sheet metal work has been used in various forms for many years. In the early days it was used mostly for ornamental purposes, such as hanging lanterns, chests, etc., but never in the history of industry has it been used to so great an extent as at present. One reason for this is the growing scarcity and increased cost of lumber. Another is the absolutely fire-proof character of sheet iron, a very important factor today.

A walk about the city will show the numerous uses to which it is put. On the exterior of the home you will find the cornices and rain conductors made of sheet metal. If it has a gable roof you will find metal ridging at the hips, while a metal "finial" may adorn the ridges. Further inspection may disclose that the roof covering is made of sheet metal in the form of tiles, or shingles, or is laid in flat sheets with standing seams. Where the home has such a covering for the roof the occupants may remain in comfort for a long time, knowing the protection such a roof covering affords. It defies all manner of weather and storms, it is lightning proof and fire-proof, light in weight and easily applied. Moreover, repairs can easily be made with this form of roof covering, and its durable qualities are unsurpassed. Old Independence Hall, Philadelphia, the Birthplace of Liberty and the home of the Liberty Bell, has such a roof covering for its protection.

If you walk around to the rear of some homes you may find a portable garage made of sheet metal. If you are of an inquisitive nature you may peep in the window or even look in the door, and you will see an automobile, made largely of sheet metal. If you retrace your steps and enter the home, you will discover other uses for sheet metal. It may be used in the form of the lighting fixtures, or a metal ceiling may adorn the home. Where such is the case the occupants need never fear that a plastered ceiling will fall upon them. In some cases you may find a glass and sheet metal aquarium, with fish swimming placidly about in it. If you could see behind some of the plastered walls you would discover that the laths that hold the plaster are made of metal, being used because they are fire-proof.

If you enter the kitchen you will find the pots and pans made of metal, while over the range there is a metal canopy, neat in appearance and finish, to carry off the excess heat and the odors of the cooking. If the heating system is of the warm air type you will find the heater casing, the warm air pipes, and the flues that lead to the various rooms all made of sheet metal. Further evidence of its value can be seen where sheet metal is used in the form of flues and ducts in school buildings, churches, hospitals, factories, department stores, and all manner of business places where an indirect system of heating is used. Sheet metal lends itself to all these uses because it is fire-proof, light in weight, clean, and easily applied.

Continuing on your walk you may hear the clang of a bell, and looking around you will see a trolley-car passing by. This car is probably made of metal. Farther down the street you may pass a moving picture theatre which has a marquise, rich in appearance, and made of sheet metal. On the wall outside, advertising the show, you will find a cabinet made of sheet metal. The cornices and the lettering used with the electric lights are all made of sheet metal. Inside you will find metal ceilings, metal lighting fixtures, and metal registers in the ceiling, which connect with metal ventilators to keep the air in the room in a fresh and healthful condition. Even the operator's booth is made of sheet metal.

After leaving the moving picture place you may see a building in course of erection. Here the workmen are pouring concrete into forms, which in a great many cases are made of sheet metal, because forms made of sheet metal can be taken apart easily and used over again. Even the shutes that feed the forms with concrete are made of metal. You may find sheet metal window frames, and perhaps fire doors made of the same material. If you enter a furniture factory you will find sheet metal playing an important part. The dust and shavings that form in the manufacturing of wooden furniture are all carried away from the machines through blower pipes made of metal, to a storage bin made of metal, which feeds the boilers through a feed pipe made of metal. If you enter the workmen's dressing room, instead of finding their street clothes hanging on nails and hooks, which was formerly the case, you will see several rows of neat and sanitary lockers all made of sheet metal. In any of our modern sky-scrapers you will find the offices all neatly furnished with filing cases made of sheet metal so that the danger of having valuable records destroyed by fire is lessened. Enter a photographer's studio and you will find the room as light as day. This is made possible through a skylight made of sheet metal. If you take a trip some time, whether by train or by steamship, or even by airship, you will find further evidence of the important part sheet metal plays. Is it any wonder this is called the "iron age"?

The sheet metal trade includes both inside and outside work. The former consists of designing and detailing the work, cutting patterns for the various shops, getting the work out on metal forms, and partly assembling it. The outside work consists mainly of assembling and erecting the various parts that are turned out in the shop. The trade affords steady work the year round for first class mechanics. The working day is eight hours, with a half-day on Saturday. To those holding the more responsible positions a high wage is paid.

The opportunities for advancement that the trade affords are numerous. A boy who begins by serving his time as an apprentice can advance to become a pattern cutter, then foreman, superintendent, and draftsman, or designer.

If a boy enters the trade of sheet metal work he should be about eighteen years of age, in good health, and physically sound. This is especially true for outside work. Good habits are essential if a boy is to progress.

A boy's education plays a large part in becoming a successful sheet metal worker. He may learn the trade either by serving an apprenticeship or by attending a trades school. Although the apprentice receives a small salary he is at a distinct disadvantage as compared with the trades school student, as he learns only what the master workmen care to teach him. A boy in a trades school, in addition to practical work, gets a foundation of mathematics, trigonometry, and physics which prepares him for the highest positions in the trade and enables him to command a higher salary.

FOUNDRY WORK

The foundry is one of the most important shops of our industrial world. From it come the castings used in making most of our machines, iron posts, parts of many farming implements, parts of stoves and furnaces, cast iron water pipe, and many special castings of brass, bronze, and aluminum used in the aircraft, automobile, and shipbuilding industries.

In order to have a casting made the foundryman must be furnished with a pattern. Suppose we need a grating for a manhole or for a drain. We would give to the foundryman, or to his assistant, the "molder," a pattern made of wood of the size and shape of the grating that we want. He would place this pattern in a "flask" made of wood or of iron, shaped like a box without top or bottom, and pack damp sand around the pattern.

When the pattern is drawn out of the sand there will remain a cavity or "mold" of the exact size and shape of the pattern. The molten iron is then poured into this cavity and after cooling the grating is ready to be used.

Often it is necessary to make hollow castings, such as cylinders for automobiles. In making molds of this kind it is necessary to place in the cavity a "core" made of sand of the size and shape of the inside of the cylinder. When the molten iron or aluminum is poured into the cavity it flows freely around the core and forms the walls of the cylinder.

The pay received by the foundryman is equal to that received by workers in other metal trades. Although the majority of foundry workers are of foreign birth, there are opportunities in this trade for American young men of mechanical and executive ability.

The boy with a grammar school education may become a molder or core maker, but he can hardly hope to rise to a very responsible position without a further education in mathematics, business methods, and chemistry. Moreover, he must become thoroughly familiar with metallurgy in its application to foundry practice. Such knowledge will be valuable to him both in purchasing raw materials and in the manufacturing processes of the foundry.

Only boys in good health, with strong, well-developed bodies should consider foundry work as a vocation. The work is heavy and the worker must stand in damp sand the greater part of the day.

MECHANICAL DRAFTING

If you like to use a pencil and ruler and draw things accurately and if you like to make drawings of wheels, engines, and machines, perhaps you would like to know something about mechanical drafting.

Mechanical drafting may be divided into three classes:

the tracing, the detailing, and the designing. Every draftsman must begin at the foot of the ladder, as a "tracer," unless he has received some special training at a good trades school. This work consists of making ink tracings of pencil drawings. The tracing cloth on which the tracings are made is of linen, so treated as to make it transparent. When a drawing is inked on this tracing cloth it can be used to make blue prints, just as a negative is used in photography. From this tracing as many blue prints can be made as are needed for use in the shops.

The "detailer" makes the pencil drawing from which the "tracer" works. The "detailer" works from freehand sketches by the "designer," using the dimensions given and drawing it to a convenient scale. The "designer" puts on his sketch the idea as conceived by the engineer.

There is a current saying, "One never sees an old draftsman." Its meaning is that the position in the drafting-room is but a step toward the positions of engineer, superintendent, and manager.

A fair preparation can be obtained under the apprenticeship system, but it is a long, tedious process. By this system the intended draftsman gathers what knowledge he can while working at drafting in a large establishment. Drafting is not so well adapted to this form of training as some other trades. A good practical draftsman must have a knowledge of pattern-making, moulding, and the machinist's trade. Besides, he must be proficient in mathematics, in the theory of mechanics, and in the proper use of English. The best preparation would be a course at a trades school, where one gets experience in all the necessary branches. Moreover, the student is trained here in all the branches at the same time, so that their close relationship may readily be seen. It has been proved by experience that the graduate of a trades school may expect more rapid advancement than one who has obtained a knowledge of his trade by working as an apprentice.

The mechanical drafting trade never offered such opportunities to young men as it does today. This is an age of wonderful machines and labor-saving devices. The draftsman cooperates with the inventors of these mechanical devices, as the plans for them must be drawn in detail before an attempt can be made to reproduce them in wood or metal.

Mechanical drafting constitutes a very necessary part of the following separate and independent trades and professions:

Structural Engineering—with separate branches covering structural steel for buildings, structural steel for bridge work, and reinforced concrete construction of both buildings and bridges.

Mechanical Engineering—including branches covering heating, steam piping, boilers, engines, refrigerating, vacuum-cleaning, blowers, air washing, and ventilation.

Plumbing—with sub-divisions covering plumbing, piping, fixtures, gas piping, and gas fixtures.

Ornamental Iron—including stairwork, grills, registers, railings, gates, store fronts, steel furniture, metal frames, sash skylights, steel sash, steel doors, and many other items of light and ornamental iron entering into buildings.

Electrical Engineering—including branches covering power generators, engines, motors, pumps, elevator machinery, wiring, conduit work, lighting fixtures, switchboards, panels, and many other items.

Civil Engineering—with branches covering surveying, map drafting, steam railroads, street railways, sewers, road building, street paving, municipal power, lighting, gas, and water plants, filtration plants, sewage disposal, etc.

Ship Building—a branch of industry that has recently employed thousands of mechanical draftsmen.

The wages of a draftsman at the present time vary from the small sum paid to an inexperienced "tracer" to the large sums paid to "detailers" and "designers." Graduates of trades schools usually obtain positions paying a fair wage at the start.

The hours of a draftsman are not long. In most of the drawing-rooms the eight-hour day prevails. Drafting, too, is one of the most healthful of trades. The draftsman is not subject to the injurious effects of chemicals, as in some trades, nor to the risk of bodily injury.

AUTOMOBILES

Perhaps you have never seen a "Benzine Buggy." Ask some older person about these first automobiles which were the limousines of twenty-five years ago. Occasionally, in those days, some venturesome soul would buy a little stationary gasoline engine and mount it in an old buggy, in more or less doubtful hope that he would succeed in making the thing move. If he succeeded he had a "benzine buggy," in which to start forth in search of adventure. Adventures were plentiful in those days. A man would scarcely consider starting on a trip in this kind of automobile without a suit of overalls, and he was considered reckless if he traveled lonely roads where a crowd could not readily be collected to help him up the hills.

Today the automobile is a staple product, a reliable and common means of transportation, and almost as important a factor in business and pleasure as the telephone. And the manufacture of automobiles has developed into one of the prominent industries of the country, employing thousands of men and involving millions of dollars.

The automobile business divides itself into two distinct branches: first, the truck or commercial automobile business; second, the passenger or pleasure car business. These two branches have many points in common, yet due to the difference in the purpose of the products they really become separate industries. The motor truck today is an absolutely essential factor in commerce, hence the motor truck business is bound to prosper and grow as long as business continues. The passenger car business, which is at present the larger of the two, is based on a less substantial foundation. It satisfies the whims and pleasures of mankind and is more or less limited by the amount of spending money in circulation.

Both the motor truck and the passenger car industries have three general subdivisions:

First comes the manufacture. Each individual brand of motor car or truck is made or assembled in a separate factory; and each factory requires the services of men skilled in many different lines of work. There are the metal workers, who temper the steel and prepare it for shaping into parts. Then there are operators for a great many different kinds of machines which take the steel and fashion it into the various parts. Next come the assemblers, who put these together to form the chassis, or mechanical structure of the finished automobile. When the chassis is complete it has to be equipped with a body. The making of bodies also requires the services of a great many different kinds of workers. Among these are woodworkers, molders, painters, oven operators, and mounters to place the bodies on the chasses.

In addition to all of the types of workers mentioned, each factory requires the services of men much more highly trained, such as engineers, to design the parts and plan improvements in the finished product, designers, to design the bodies, and managers and foremen, to direct the work of others.

The second subdivision of the business is the marketing or selling of the finished product. Each manufacturer has agents in all of the larger communities throughout the country. Each agent maintains a salesroom where he displays the particular make or brand of car which he represents. He also employs a sales force consisting of salesmen, whose duty it is to sell the cars, and a sales-manager, whose duty it is to help the salesmen and to supervise their work.

The third subdivision of the business is the "service" or repairing of the cars. An automobile is a pretty complicated piece of machinery and is continually subjected to severe strains; hence it requires a good deal of repairing to keep it in running order. Repair work requires the services of two general classes of workers—electricians and mechanics. A good automobile repair-man has steady employment, and does not find it hard to get a position.

The striking thing about the automobile business is that it offers very little opportunity for success to a man without at least a fair education. To be successful in any of the branches a man should have a good thorough knowledge of the principles of physics, and this means at least a high school course in this subject. To be successful in the sales end a man should have, in addition, a general education and be able to talk intelligently on almost any subject.

GLASS MAKING

If you look at a window-pane or a glass bottle you will never suspect that it could be made from sand. Many thousands of years ago the ancients discovered how to make glass from sand, and the process has been carried on through many centuries, but it is only recently that it has come into common use. For a long time glass was so expensive that it was regarded as a luxury, and its use was confined to the wealthy classes. Although the making of glass was one of the first industries attempted by the English colonists in America, it was not generally used for windows. In those days oiled paper was used in most of the houses to admit the light.

If we visit a glass factory we shall find ourselves in a huge building with a large furnace in the center. The furnace is so built as to secure the greatest possible amount of heat; the walls are made of the best quality of fire brick and are very thick and heavy. As an intense heat is required, gas is the best fuel.

The materials, consisting of sand, lime, and soda or potash, are thoroughly mixed in a long box or trough; the mixture or "batch," as it is called, is then shovelled into great tanks or pots which are placed in the furnace. It usually takes from twenty to twenty-four hours to melt the mixture thoroughly, in which time it is raised to such a degree of heat by the gas flames which pour over it that it becomes a molten mass which seethes and boils and bubbles. As the mixture melts, the impurities rise to the top and are removed by skimming them off the surface. After it has become thoroughly melted and purified it is allowed to flow out of a hole in the tank. It is now something like hot taffy, and as soon as it has cooled off a little it is taken away to be made into window-panes or bottles or table-ware, as the case may be.

A great deal of our ordinary glassware is made by pressing. The workman cuts off a piece of the molten glass and drops it into an iron mold the exact shape of the article to be made. This is pressed into shape by a plunger, and as soon as it has cooled a little it is taken out and polished. It is also annealed or tempered to keep it from breaking. This is done by placing it in a heated oven, where it is left for a long time and allowed to cool very slowly.

Window-glass.—Most glass products of the better grade are made by blowing the molten mass into various shapes after it comes from the furnace. Even common window-glass is made in this way. A man dips a long iron pipe into the mass of soft, hot glass and gathers a great lump, weighing about twenty pounds, on the end of the pipe. He then passes it on to the blower, who stands on a narrow platform over a pit about ten feet deep, in order that he may swing the pipe around in every direction without hitting the floor. As he blows the lump becomes larger and larger, like a soap bubble, and hollow. By a process of alternate heating and blowing he finally gets it into the form of a long hollow cylinder, closed at the ends. First the ends are cut off, and then a line is drawn with a diamond or a red-hot iron from one end of the cylinder to the other, and it is placed in the flattening oven with the marked side up. In a short time it opens along the mark, and under the influence of the heat flattens out into a sheet. It is now smoothed and polished by a series of other processes, after which it is placed in the annealing chamber and tempered.

Plate Glass.—Our largest and finest windows and most of our mirrors are made of plate glass, which is manufactured by a different process. The melted glass is spread out upon a large table, with a rim around the edge, and rolled with a heavy iron roller. After annealing it is ground and polished to a very high degree. Plate glass is much thicker and heavier than ordinary window-glass, and has a more brilliant lustre.

Cut Glass.—Many articles in common use, such as tumblers and vases, are blown by a process similar to that used in making window-glass. Bottle-making is a big industry in itself, and a great many bottles and jars are now blown by machinery. Cut glass is made by first blowing or pressing the piece into shape, and then grinding out the design by means of revolving wheels of metal or sandstone with sharp edges. As every piece must be cut separately by hand, and requires a great degree of skill, cut glass is very expensive and very highly prized.

The glass industry is a very important one in this country, and Pennsylvania has long held a prominent place as a glass manufacturing state. Very few girls are engaged in this industry, except in the offices, although some are employed in etching and decorating the various glass objects, and others in the wrapping and packing departments.

Although a glass factory is so interesting a place to visit, it is not a pleasant place in which to work. The work, except that of a small number of persons, is not highly skilled, and the intense heat makes the conditions very unhealthful. Then, too, the fires are never allowed to cool down except for a little while in summer, and in order not to waste the fuel most glass factories remain open all night. As a result the men are rquired to work in the daytime for one week and at night the next week. The wages are usually rather low with the exception of those paid to blowers, who are specially chosen because of their lung power. A great many boys are employed in the glass industry, and they can enter at almost any age, as the training is practically all acquired in the factory. As in most states, however, the child labor law forbids children under sixteen working after eight o'clock at night, it is probable that the factories will not in the future employ many children under that age. This is fortunate, as it is not a desirable industry for young boys to enter. It is hard to accustom one's self to sleeping in the daytime, and the hot blasts of air from the furnaces constantly blowing over the workers are very injurious. It is unfortunate that the manufacture of a product which is so useful and necessary as glass should be attended by such unfavorable conditions.

PAPER BOX MAKING

There is a certain fascination about the making of paper boxes. Varieties, shapes, colors, and sizes are never ending, and a really interested girl who enters the trade has plenty of opportunity to demonstrate her ability. After a necessary period of learning at weekly wages she is put at piece work, where she is paid for the number of boxes she makes, and the limit of her earnings depends on her own skill and the rate she receives per box.

Making a paper box seems somehow to be intended as girls' work. The men and boys can cut and score to the proper sizes the large sheets of cardboard used to make the rough foundation of the box, but when it comes to any of the dozen other operations in box making, the deft fingers of a girl or woman are essential.

The first operation in making a paper box, after the cardboard has been scored and cut out to the proper pattern, is to turn up the sides and ends so that they meet at the four corners, and then paste a strip of gummed paper on each corner to hold the box in shape. Machines are used by the girls to attach this strip, but the end and side must be held together by the operator on a form, while a plunger automatically attaches the strip of gummed paper and forces it tight against the corner of the box.

To the observer this looks like a very dangerous machine, as it would seem hard to avoid getting a finger under the plunger and having it mashed. This was true in the old days, and many accidents happened. But the present machines have an arrangement which prevents any pressure being exerted on the corner of the box until after the plunger has closed up to a point where a finger could not possibly be inserted. Should an operator's finger be inserted before it has closed to this safety point the pressure will not operate, and no damage can be done. This is typical of the improvements now used or being made in all industries for the betterment of working conditions for employees. Scores of factory inspectors are maintained by most states to see that proper safety devices are provided for machinery.

The need for deft fingers is seen in the next operation, where a covering paper is wrapped around the rough cardboard that gives the box its form and strength. Various types of boxes require different styles of paper coverings or trimmings, but in each case a delicate touch is required to handle the freshly gummed wrapper or strips of paper and fasten them neatly, securely, and without soiling.

Some boxes are covered only on the sides, with a small edge lapped under the bottom and over the inside edge at the top. For this work the box is placed on a revolving block and a strip of freshly gummed paper, unwinding from a roll, is wound around the box as it is revolved, end on end. Another style of box may require a strip of gummed paper only on the edges. Boxes for certain uses require extension tops and bottoms, and must be completely covered with fancy paper wrappers. Automatic machinery is used for the actual operations, but the material must be fed into the machines by hand.

The demand for paper boxes has grown so steadily in recent years that the custom of laying off employees during dull seasons has been largely eliminated. Paper boxes are now used as containers for nearly one thousand products, so the industry offers employment regularly throughout the year.

The working day is from eight to nine hours, with Saturday half-holiday. The scale of wages is only fair, but compares favorably with similar factory employment. Usually a girl is kept on one kind of work without change, and for this reason there is but slight chance for high or rapid advancement. Most paper box factories prefer to employ those who have reached sixteen years of age.

It should be emphasized at this point for girls, as it has been elsewhere for boys, that no girl should leave school, unless compelled to, until she has a pretty clear idea of what line of work she wishes to follow. It was suggested in the introduction that a girl or boy might profitably use a summer vacation in working at a particular occupation. This will give a more definite idea of the opportunities it has to offer and the amount of education and training necessary in order to reach the top.

THE PUBLISHING TRADES

PAPER MAKING

The products of almost no other industry enter so directly into the lives of the people as those of the pulp and paper industry. Without paper there would be no newspapers, no books, no magazines, no wrapping paper, no bag paper, nor the thousand and one other uses in which paper is so necessary that it would be hard to live without it. Moreover, paper has played a tremendous, immeasurable part in bringing about the present state of civilization of the world. No other agency has helped educate and inform people as has paper.

As an industry of the United States the pulp and paper production ranks twentieth in the total value of its output. Unfortunately, however, the industry has grown practically not at all in the last ten years in the United States, only one large mill having been built since 1910. This has been due, first, to the fact that paper comes into this country from Canada free of duty, and second, because wood pulp is necessary in paper making, and the Provinces of Quebec, New Brunswick, and Ontario, in Canada, do not allow wood cut on their Crown lands to come into this country. These two facts have resulted in the building in Canada of the great paper and pulp mills which might have been built in the United States.

What are called the cheap papers—such as newspaper, wrapping paper, bag paper, and some book papers—are made practically entirely of wood. Writing paper is made of rags.

Not all kinds of wood are suitable for the manufacture of paper. In newspaper, for instance, spruce and balsam woods are used almost entirely, hemlock being used to a very small extent. Pine cannot be used in making newspaper because of the pitch it contains. Pitch would cause trouble in the paper-making machines.

Wood is usually cut in the forests in winter, and is either floated down a nearby river to the paper mill or is sent by railroad or by steamship to the mills. When paper mills were first built forests were so near by that the cut wood was dropped into the river and floated down to the mill, where it was hauled out. Forests have now been cut down to such an extent, however, that wood can no longer be floated to most mills.

After the wood reaches the paper mills it is made into pulp. There are two kinds of pulp made. One is ground wood pulp and the other is sulphite pulp. Both are necessary in making newspaper, which is four-fifths ground wood pulp and one-fifth sulphite pulp. Ground wood pulp is made by grinding up wood, while sulphite pulp is made by treating wood with sulphuric acid. Sulphite pulp is stronger than ground wood and is the backbone of newspaper and similar papers.

After the two pulps are mixed in the right proportion they are sent over a long mesh wire and between rollers, which take out the water as far as possible. Then the paper goes over great drums, with steam inside, which dry it still further. The paper is then wound in rolls and wrapped, ready for shipment to the newspapers.

An attractive occupation in the paper industry is that of the technical man who has had an education at college in the chemistry of paper making. There is a great need of able men in that field; not the routine chemists or technical men, of whom there is an abundance, but men of exceptional ability and vision—men with a good education.

PRINTING AND PUBLISHING

Before printing was invented books were made on long pieces of specially tanned and bleached skin, called parchment. Every book was written separately by hand. In the Middle Ages the monks in the cloisters and monasteries copied them. As this required much time and labor, books were very expensive.

It is said that the Chinese were the first to invent the art of printing from type. However, they kept this knowledge to themselves, and it was not until about five hundred years ago that the art of printing, as we know it, was first invented in Europe. Since that time it has gone through a great many changes and has become a very important industry. More than fifty million books are published in the United States each year.

When a book or paper is ready to be printed the first thing to be done is the typesetting. Until a few years ago this was all done by hand. The typesetter or compositor took the pieces of type and set them side by side in their proper places. This is still done in small shops, which print chiefly cards and circulars. During the last few years, however, nearly all typesetting has been done by machines, called linotype and monotype machines. These machines not only set the type in place, but make it as well. The operator sits in front of a keyboard, and as he strikes the key for each letter a bit of melted lead is poured into a mold the shape of the letter, and then as it cools it is dropped into its place in the line. After the printing has been completed the type is melted again, ready for use the next time.

As there are always some errors to be corrected before the printing is done, the matter is first set up in long trays called "galleys" and not put at once into page form. The type is inked, and a first impression, called a proof, is taken. This proof is compared carefully with the original copy and the typesetter makes any necessary changes in the type. When all of the corrections have been made the type is divided into pages, and each page is tightly locked in an iron frame to keep the type from slipping or falling out. It is then placed upon the press and is ready for printing.

When the type has been securely fastened on the press the paper is laid in place and the machine is set in motion. Most printing presses are now driven by steam or electricity. The type is inked by great revolving rollers, which pass over it at regular intervals. At the same time the paper is seized and held securely in place by one part of the machine, while another part lifts it up and presses it firmly against the type. It is then removed and another sheet is put through the same process. Some machines print the sheet on both sides at one operation, in others it has to be turned over and run through the press a second time. A number of pages are printed on each sheet, and after it comes out of the press it must be folded and cut. Unless it is a small pamphlet or circular with only a few pages, the different sections have to be put in their proper order, sewed together, and fixed in the case or cover. These last operations belong to the art of bookbinding, which is sometimes done in the printing house and sometimes in separate establishments.

Although small jobs are usually printed in the manner described, newspapers and large editions of books are not printed directly from the leaden type, because it is too soft. Instead, a cast is made in the exact form of the type, but in a harder metal. This is called stereotyping or electrotyping. The processes by which plates for maps and pictures are made are called engraving and lithographing. All of these are highly specialized processes and are performed by the most skilled workmen in the printing trades.

On the whole, the printing industry offers a good opportunity for the boy who wants to learn a trade and has a liking for this kind of work. The conditions are healthful, although the work is dirty, and the boy must not be afraid of soiling his hands. The employment is regular and the pay is better than in most manufacturing establishments. If the boy is industrious and intelligent there is a good chance for advancement to the position of skilled pressman or foreman. Later, if he is enterprising, he may set up an establishment of his own.

The best plan for the boy who intends to be a printer is to go through the grammar school and then take a course in a trades school. In this way he will gain a knowledge of every branch of the trade, whereas if he enters a printing shop as an apprentice he is likely to learn only one process, and to stick to that all of his life. It is generally agreed that some high school training is of great value, although not absolutely necessary. The compositor must have a good general education and a solid foundation in English.

Employers often complain that beginners are deficient in reading, writing, spelling, grammar, and punctuation, and lacking in general intelligence. It takes a practised eye to see how reading matter will look when printed. There are hundreds of different styles of type from which to choose, and the correct arrangement of headings and titles, and the proper selection of ink and paper, are often dependent upon the knowledge and skill of the printer. The man who would make books must know books; and if to mechanical skill he can add good taste, artistic sense, and a broad general knowledge, the greater will be his chances of reaching the top.

Although the printing trades are chiefly for boys, there are opportunities for girls as well in various branches of this work. Women are sometimes employed to operate typesetting machines, but this is rather heavy work. Thousands of girls are employed as proof-readers and copy-holders, and in various other clerical occupations that are peculiar to publishing houses. The operations which are performed by women in all of the printing trades are, as a rule, less skilled than those done by men; and printing or publishing-house work is not to be as highly recommended as an occupation for girls as for boys.

BOOKBINDING

If your geography, arithmetic, or spelling book wears out, and you must have a new one, how do you think it is going to be made for you? In the first place you know that it must be made of sheets of paper, held together in some way, and fastened into a cover to prevent it from being torn apart easily and from losing its pages.

After the paper has been made nice and smooth in the paper mill it is brought into the printing shop where the men feed it into big printing presses. Instead of printing just one page at a time, several pages are printed on one large sheet. The large sheet is then folded several times in order to get the pages in the right place and order. This work is called "hand-folding," and is done by girls who use an ivory folding-stick, with which they can fold the sheets smoothly, cleanly, and quickly. When there are a great many copies of one book to be made this work is usually done by a machine, and is called "machine-folding." The girls are then used to feed the large sheets of paper into the machine. If the book is to have illustrations that have been printed separately, the girls paste in the pictures where they belong, and then press the sheets so that there will be no wrinkles. This is called "plating."

The next process is "gathering up" the pages in the proper order, so that the numbers 1, 2, 3, 4, etc. will follow each other correctly. Have you ever found a page in a book where it did not belong? This is because the girl gathered up the wrong one. Usually, however, the mistake is discovered by the examiner or collator, who looks to see if the numbers are in order before the book is finished.

When the pages are arranged they must be held fast together so that the book will not fall apart when it is read. Very fine books are sewed by hand with a big needle and coarse thread, but school books and others are sewed by machine. The girl at the machine must be as expert as the one who sews by hand, for she must know how to thread the machine, how to adjust it to the size of the leaves she is sewing, and how to run it. In order to save time a number of books are all sewed together, one after the other, without stopping to break the thread between them. They must, therefore, be cut apart. The girl who does this is usually a beginner and is placed at this task because it requires no skill. She uses a sharp knife and is called a "slipper."

The book is now ready for the cover, and is taken to another part of the bindery. At present this work must be done by men, as the union will not admit women. The girls, therefore, have nothing to do with the actual binding except to lay little strips of gold leaf for those titles that are printed in gold. When the book is entirely finished it is inspected and wrapped. This work is done by girls.

When a pamphlet is to be made the sheets are folded and gathered in the same way. Since it is not so thick as a book the leaves are held in place by little pieces of wire or staples. This is called "wire stitching," and the pamphlet is glued into a cover. This is not such particular work as book-work, and therefore each girl learns to make an entire pamphlet instead of specializing on one process. If a ledger or account book is being made the sheets must be indexed and numbered.

Very few of the processes of this trade are done under conditions that are harmful in themselves, except the laying of gold leaf. As this must be done where no current of air can disturb the gold the windows are kept closed, and the atmosphere often becomes so impure as to be injurious to the health. In summer there is the added discomfort of the heat from the steam presses which stamp the letters. In the majority of cases the workrooms are clean and sanitary.

In most factories the bindery girls work forty-eight hours a week. Occasionally, when a big order comes in, it is necessary for them to work at night. This trade does not lay off girls regularly for certain months of the year, like some other trades, so it cannot be said to have a busy or dull season. The management may try to distribute the work so that the girls shall be steadily employed, but if wages are unusually high the firm will dismiss girls in the slack time. The seasons vary according to the kind of work done. When school books are made the factory is busy in the late spring and summer; when bibles are made the busy season is the autumn, because so many people buy them for Christmas presents; and when blank-books are made the busiest season is just before the New Year, for people start their new accounts on the first of January.

There is no system of apprenticeship in the trade, but the girls usually begin as slippers, or as folders of pamphlets and blank-books, and then move on to book work, which has to be more carefully done. The most skilled processes are machine sewing, plating, gathering, and collating. The new girl prepares herself for machine work by observing the operators, and by proving herself neat and careful at her own task. A finger mark on the clean white page of a book would spoil it. She must be very quick with her fingers.

Learning your lessons well while you are in school will be a great help if you want to be a bookbinder. If you can possibly do so, stay in school until you are sixteen years old, for girls of fourteen and fifteen are not very often wanted in this trade.

The interest of the work depends on the kind of book in which the establishment specializes. Catalogs are not so interesting to work on as books, and for the finer books girls who take pride in their work are valuable. Old establishments formerly preferred to employ girls who came from the same family, or were recommended by employees, so that the workers might be congenial.

Well established firms often keep their employes a lifetime, as the interesting work, clean surroundings, and pleasant companionship make up in part for the moderate wages and the lack of opportunity for great advancement.

PHOTOGRAPHY

Photography is the wonderful, modern method of copying or reproducing an image. It is divided into two branches, portrait and commercial work; and is again subdivided into several lines, such as the retouching of negatives (which is usually done by girls), color photography, coloring of prints, copying, reproducing, enlarging, making of lantern slides, exterior and interior work, and moving pictures. Just as doctors have specialized on certain parts of their work, so have many men and women become experts in the different lines of photography.

Before leaving school to take up this work a boy or girl should be familiar with such subjects as the following: chemistry of photography, the study of lenses, lighting, color mixing, and the tables of avoirdupois, apothecary, and troy measure, liquid and dry measure, bookkeeping, and salesmanship. It is very important to understand how to mix chemicals, make prints, develop negatives, make copies, enlargements, lantern slides, and blue prints, and to know a little about electricity for the arrangement of lights. So you see that in photography, as in other work, you must know what you are doing before you can do it well. This means, of course, both hard study and much experience.

This art or occupation differs from many others, in that after learning it one can soon branch out for himself. The hours of employment are good (usually eight hours a day), except at times when you are engaged in special work for which you receive extra pay. Wages vary according to the type of work. Moving picture experts and those who work in color photography are examples of photographers who receive very good salaries. Of course, those who specialize and become expert earn most.

There is hardly a boy or girl who has not taken pictures at some time or other, and many possess cameras of their own. Perhaps you have even developed negatives and printed pictures or have assisted someone else in these interesting operations. If you think you would like to be a photographer, you can learn the fundamentals in this way while you are still going to school, and you will soon realize the need for more education if you would become an expert.

THE CLOTHING TRADES

MEN'S CLOTHING

Would you like to take a trip through a large factory where thousands of suits of men's clothing are being made? If you live in a large city like Philadelphia or New York, which are the leading centers for the manufacture of ready made clothes in the United States, this can easily be arranged.

Let us take such a trip through one of these busy workshops. As we enter the building we pass by the various offices where this enormous business is administered. We are provided with a guide and taken by elevator to the top floor of the building, where we begin our tour of observation. On this floor is the stock. Here we find piece after piece of cloth ready for the cutters. At the other end of the floor are piles of clothing, awaiting shipment, all carefully tagged. Around the sides of the room are boards so arranged as to give the number and location of all goods in the factory. Men and women are employed here, with a few boys and girls to aid in taking care of the enormous stock.

As soon as the cloth is taken from stock it is sent to the sponging room, where it is dampened and pressed by being passed through a huge steam roller. It is then sent to the cutting department.

On the floor below we find the pattern and cutting room. The cloth is laid out on large tables and the patterns carefully laid on and chalked out. They are placed so carefully that only the tiniest pieces are wasted. Some cutting is still done by hand, but most of it is done by machinery. The machines can cut through as many as forty thicknesses of cloth. They contain circular disks which revolve like buzz saws. These machines are run by electricity and it requires considerable strength and skill to operate them. It takes a man three or four years to learn to use one successfully.

Below the cutting rooms are huge operating rooms where men and women are employed putting various garments together. This work is divided into numerous processes. Each operator does one particular thing. Here is a woman putting a kind of selvage on the side of the trouser leg to keep it from fraying. This process is called serging. There we see a man busy putting in the hip pockets. Others are busy basting, seaming, fastening in sleeve linings, turning up trousers, working on collars, making buttonholes, sewing on buttons, or doing any of the thousand and one things required to complete a suit of clothes.

All the machines are run by electricity and each is particularly adapted to its own special process. The machines for sewing on buttons are especially interesting. With a little adjusting they are capable of sewing on buttons with either two or four holes in them. Such improved methods save an enormous amount of time and labor.

Side by side with the operating goes the process of busheling or pressing. This is done from time to time as the garments progress from stage to stage. Much is done by hand, but some is done by machine. A machine consisting of two long, hot iron plates which open and close and exert considerable pressure is used for creasing and pressing trousers. When the operator finishes with the garment it is passed on to the cleaners, who take out bastings and cut off threads. When this is done the tag is put on and the finished product is sent to a stock room.

All the processes described require skilled labor, and there is very little opportunity for the boy or girl just leaving school. Girls between the ages of sixteen and eighteen are taken into these factories and trained in operating. They are seldom assigned machines before they reach the age of eighteen. Before reaching this age they do unimportant work, such as cutting canvas and padding and preparing belts for stitching.

Chances for advancement are few. Each person learns one kind of work and is not encouraged to move from machine to machine. It is only when one shows unusual ability that opportunity is given to run other machines. A skilled operator may earn a fairly good wage.

SHIRT MAKING

"From loom to wearer" is, in a nutshell, the story of the process of shirt making, one of the oldest industries of this country.

To find out the various occupations in this industry we shall begin in the beaming room. Here the warp is prepared, spun cotton, artificial silk, and real silk being unwound from spools and made ready for the loom. In the weaving room most of the operators are women, each running four looms and sitting as she watches the machines.

After the cloth is woven it is sent to the finishing room, where it is washed, bleached, dried, pressed, and measured, after which it is ready for the cutting room.

Here, on tables thirty yards by forty inches, are spread thirty-six, sixty, and in the case of army work even one hundred and twenty thicknesses of material, pinned securely in place. On this are laid metal-edged cardboard patterns of the various parts of a shirt—front, back, yoke, sleeve, collar, cuff, neck-band, etc.—around which are drawn chalk-lines. With the utmost accuracy the cutter follows these lines, using a small, very sharp knife that cuts through all the thirty-six or sixty thicknesses. All civilian work is cut by hand, but army shirts are cut by machinery.

As previously stated, the army material is spread out one hundred and twenty thicknesses at a time, on top of which the patterns are placed and chalked. The operator, using an electric cutter, follows the chalk lines, cutting through the material very rapidly. The cutting machine is a small affair, consisting of a thin, flat, metal base on top of which is an electric motor. To this an upright steel blade is fastened, with the cutting edge to the front. This blade is capable of moving up and down very rapidly. In back of the motor is a handle by which the operator easily moves the machine along the traced lines, cutting through four inches of material at one time. It has been said that this machine does not know how to make mistakes, but it must be worked by a very expert operator to accomplish this feat. Two such experts can keep eight men busy unrolling the material and folding it to be cut. After being cut out the various parts of the shirt are tied up in bundles and marked in such a way that the right parts are brought together in the finished garment. In this shape they go to the operating room.

In this room are rows of electrically driven sewing machines, very much like those in our homes, except that most of them have two needles instead of one, thus stitching two rows at a time. Each operator does a special kind of sewing, such as stitching the fold down the front, making the neck-bands, sewing the placket on the sleeve, making the cuffs, putting the yoke on the back, joining the back and front, doing the hemming, joining the sleeves to the shirt, putting on the cuffs, sewing on the neck-bands, making the buttonholes, and finally sewing on the buttons. After the shirts have been inspected they are sent to the laundry room.

The soft shirts are ironed without being washed, but the stiff shirts are first washed. The latter are placed in a huge cylindrical washer, which revolves first in one direction and then in the other. After the rinsing process they are placed in the wringing machine, which runs by electricity and revolves very rapidly, squeezing the garments almost dry. Then the shirts are starched by hand, and placed on hangers suspended from an endless chain. This chain moves slowly, carrying the wet shirts through the drying room, which is heated by steam, and from which the garments emerge perfectly dry. The shirts are then sprinkled and ironed by hand, folded, and passed on to the shipping room.

The negligee shirts are ironed entirely by machinery, each part of the shirt passing through a machine made particularly to fit it. The lower part of each machine, made of iron and heated by steam, is covered first with asbestos, then with several layers of padding, and last of all with unbleached muslin. Suspended above this is a heavy, thick piece of iron, also heated by steam, which is lowered when the operator touches a treadle with her foot. For a few moments this remains on the neck-band, cuffs, yoke, or front, as the case may be, until that part is ironed dry. Each operator runs two of these machines at a time. Before the neck-band is placed in the ironing machine it is dampened by being passed between two rollers covered with soft white material on which water is constantly dropping.

Both men and women operators are employed in shirt factories, the men doing the cutting, some of the hand ironing, all of the work in the finishing room, and some in the weaving room. The women work the sewing machines and the ironing machines, and also the looms. There is practically no danger connected with the occupations, and even though the work is all indoors the conditions are healthful. Everyone handling the shirts is required to be clean and neat, which brings a desirable class of women and girls into the occupation. Employment is steady the year round. A nine hour workday with Saturday half-holiday is the rule, the men but not the women being allowed to work overtime. No one under sixteen years of age is employed. A few experienced operators receive good wages, but the average wage of the piece worker is not large.

There is advancement for the girl who is willing to apply herself, the best chances being for the one who can learn to operate many different machines. The forelady is always taken from an operating machine. Trades school training is most valuable, for it shortens the time of apprenticeship and saves the firm the loss of material due to the mistakes of the learner.

DRESSMAKING

Dressmaking is a custom trade. A custom trade is one in which the product is made for individual customers to special measures or specifications. Custom-made dresses are usually made partly by machine and partly by hand, so the dressmaker must know both methods of work.

In most dressmaking establishments the work is subdivided, so that each worker may do that part of the work in which she displays the most skill. This has created other occupations in the trade, known as waist draper, waist fitter, skirt draper, skirt fitter, and finisher. A shopper is sometimes employed to make the incidental purchases which are necessary in matching colors, purchasing trimmings, etc. Some dressmakers are men, though the majority are women.

The Dressmaker.—The dressmaker is usually the business manager and owner of the establishment, and frequently the designer as well. She employs the helpers and pays the wages, keeps the accounts when a bookkeeper is not employed, sets the prices on garments to be sold, attends to the payments of bills for rent, heat, light, supplies for the workrooms, and other running expenses, and does the banking for the establishment. She meets customers, designs dresses, plans or directs the planning of garments to be made, manages the workroom, and inspects finished work.

Designing requires a knowledge of types of figures, the use of the principles of line and proportion as adapted to physical characteristics, the use of color in relation to the wearer, and the use of fabrics of various textures to obtain the results desired. The combination of fabrics has also come to be a recognized part of dress design. The successful dressmaker is expected to have a good working knowledge of these principles.

The dressmaker must know the markets for goods and trimmings and their prices and values. She must know something about the labor supply of her trade and the range of wages to be paid. This phase of her business is especially important, as custom-made dresses have to compete with the factory-made product, and cost of labor is a large item of expense in business. She must also know how to sell her product. The dressmaker must have a working knowledge of simple accounting and business methods. She must know how to make estimates and set prices, and how to write an acceptable business letter.

The Waist Draper.—The waist draper makes the waist which has been planned by the designer. She drapes the cloth of the dress form so as to secure the effect desired, cuts the parts of the waist, and bastes them together ready for the fitting. Waist draping includes the making of the body of the waist and the trimmings that are used for decoration and finish.

The Waist Fitter.—The waist fitter fits the waist prepared by the draper to the customer. Lines may be altered and size changed. Changes to be made are carefully indicated and the waist is returned to the draper to be altered and finished.

The Sleeve Maker.—The sleeve maker designs the sleeves or makes them according to the design made by the dressmaker, cuts the cloth, sews the seams, and makes cuffs or other trimmings to be used. The skill of the sleeve maker lies in her ability to drape the sleeve so that it hangs well when worn. This is secured by a special process in making the sleeve seams.

The Skirt Draper.—The skirt draper makes the skirt which has been suggested by the designer. She drapes the cloth over the dress form if the cloth is thin and soft; if it is thick firm cloth a pattern is used for the cutting, after which the parts are basted together for fitting.

The Skirt Fitter.—The skirt fitter takes the skirt prepared by the draper and fits it to the customer. Lines are adjusted to the wearer's figure, fulness is determined, and trimmings are arranged. Changes to be made are carefully indicated and the skirt is returned to the draper to be altered and finished.

The Shopper.—The shopper makes the small purchases for the establishment. She matches goods with threads of the proper color, and buys silks, trimmings, laces, linings, etc. To do this work successfully the shopper must know fabrics, colors, and the various kinds of trimmings. She must be able to take directions and carry them out quickly and successfully.

The essential physical qualifications are good eyesight and good health, with no tendency to stooped shoulders or anemia.

The trade and technical qualifications are ability to sew by hand and machine, knowledge of the processes used in garment construction, ability to construct garments or parts of garments, accuracy in measurements, knowledge of fabrics, neatness in handling work so as to preserve the freshness of the fabric and the shapeliness of the garment, knowledge of the texture or grain of the cloth and ability to use it in designing or shaping the garment, and ability to cut garments. Knowledge of cutting and designing are essential to promotion to the higher positions.

Dressmakers should have a good fundamental education of not less than the eighth grade, and preferably of high school grade. Educational requirements include a knowledge of arithmetic through fractions, decimals, and percentage, plus the ability to apply these processes readily to business practice and workroom problems; ability to write an acceptable letter; knowledge of business transactions including simple bookkeeping, writing of bills and receipts, keeping a bank account, and writing of checks. Public trades schools for girls in Philadelphia and many other cities give this training and eliminate apprenticeship. Evening courses are provided in public and private schools.

Personal qualifications include initiative, alertness, honesty, promptness, and willingness. Many employers value cheerfulness among the personal qualifications, and cleanliness sometimes needs to be mentioned as a requisite.

MILLINERY

When we speak of the millinery trade we do not include the making of men's or women's straw hats and felt pressed hats. Millinery implies all the art, originality, and skill that go into the creation of a stylish hat, whether it be a bonnet, toque, sport, or evening hat, made for custom trade.

The processes in the trade fall into two parts: (1) making the hat; (2) designing and trimming it. The "maker" constructs from measurements the wire or buckram frames and covers them with silk, velvet, chiffon, or straw. Perhaps she has to do this from a sketch, with only a few measurements to guide her. Her work must be absolutely accurate and she must handle the materials in the way calculated to give them the most artistic appearance.

All of the little things necessary to a finished hat are done by the apprentices, who learn in succession the making of bands, lining, wiring bows, hemming silk, and velvets, making folds, shirring materials, and sewing on braids, all of which must be done so that the stitches do not show.

The most expert part of the trade is done by the "designers," who are responsible for the artistic and creative work and who supervise the "makers." It is generally conceded that trimming cannot be taught except to the girl who possesses natural aptitude for the work. Such a girl will learn quickly through observation and practice. The smallest ornament must be put on in the most effective place and way, and the combination of colors must be carefully chosen.

There is another type of worker in the millinery shop, the "copyist," the girl who copies with absolute accuracy a model hat brought probably from New York or Paris. She does the whole thing from frame to trimming and is a skilled worker. Her position is lower than that of the "trimmer," however, because she does not supply original ideas.

In a millinery workroom the trimmer usually sits at the head of a table, around which are five, six, cr seven makers and apprentices carrying out her directions.

There are various types of establishments in which a millinery worker may be employed. The smallest is the home millinery shop, usually occupied by a woman who has a trade among her friends and who makes the hats to suit each individual customer. Next in order is the millinery store, with its shop window displaying a number of hats to attract pedestrians. In the fashionable districts of the town there are usually more of such workers than in other districts. Sometimes thirty or more girls are employed in a single shop.

Steadily growing in popularity are the millinery departments of the department stores. Here cheap hats, as well as the high-grade expensive ones, are made. The advantage to the girl who works in one of these millinery workrooms is that in dull seasons she may be given a place in one of the other departments of the store.

Wholesale manufacturing millinery establishments are places where hats are trimmed in large quantities and where speed is more in demand than fine work.

Millinery was formerly a seasonal trade; the spring season started a few weeks before Easter and lasted until June; the fall season started in September and lasted until November or December. Today there is rarely a season so dull that the workers are laid off, as there is a constant rotation of fashion, every month introducing its distinctive style and material.

The "fashion trades," however, present to the worker the problem of a rush season, accompanied by overtime work and by a speeding-up process. This means that each girl is pushed to her limit of speed in order that those customers who demand their hats "at once" may be satisfied.

Millinery is one of the few trades in which an apprenticeship system still exists. The learners, as a rule, are required to give six weeks in the spring and six weeks in the fall for two years before they become "makers." During this time they are paid only a small sum each week. It is therefore unwise for a girl to enter this trade who is dependent upon her own earnings from the moment she leaves school. Of course, it must be remembered that this apprenticeship takes the place of the special trade training that workers in other lines must get in business or technical schools.

Trades schools for girls, with courses in dressmaking, millinery, etc., have been slower to develop than similar schools for boys, but trade training for girls is gradually being incorporated into the public school systems of many communities. The specialized trades schools for girls offers courses in dressmaking, millinery, and light power machinery operating. Millinery may also be studied in evening classes. Such training shortens or eliminates apprenticeships and hastens advancement in the trade. To the girl who adds to such training a talent for artistic and original designing, the trade offers great opportunity for advancement.

Fair wages are paid in the various branches of the milliner's trade, while some of the experienced trimmers and designers receive a wage which compares favorably with that paid in other occupations.

STRAW HATS

Think of the time and care used in the selection of a woman's hat, yet few purchasers know anything of its life story. Let us enter a factory that turns out many straw hats of great variety and beauty every day. In one room we see a number of girls sitting beside long narrow tables. In front of each girl is a small sized sewing machine run by electric power, and on this machine straw braid is being sewed, row upon row, into various shapes.

The straw braid comes from a reel that is close beside the operator. Every now and then the girl stops her sewing and adjusts the braid to a mold of plaster of Paris which stands close to the machine. We notice that each girl has a separate model which bears a specific number. These numbers tell the particular styles ordered by the customers.

Before beginning a new shape the operator takes a tiny bunch of braid between her fingers and sews it by hand, to give a little foundation on which to start. Then, with an occasional reference to the model as guide, the braid is quickly fashioned into a crown and brim of the required style. Though the shape may appear finished to our untrained eyes, several processes are still necessary for its completion. The frame is taken into another room to be stiffened. Here it is dipped into large basins of hot liquid. On inquiring, we find that the basins contain glue and hot water in different stages of thickness. In dipping the frame the brim is entirely covered, while the crown which remains above the solution is quickly wiped over by the moistened sponge. The hats are now placed on molds of the same shape, sponged over, and put on a rack to dry, after which they are hung up ready for the next process. As soon as the drying is completed the frames are ready to be blocked or pressed.

All about us we may see molds for hats, either of plaster or of metal. Every conceivable shape is represented in these molds. In answer to our inquiry we learn that as soon as a new style is devised not only is it necessary to have the plaster mold, but a die of metal must also be obtained. Upon these the hats undergo the third process, that of blocking. This is done by the hydraulic press. The hat on the metal die is placed in an inverted position in the press, a rubber pad being laid above. The top of the machine is then clamped down, and the operator, by working a lever, accomplishes the pressing of the hat. We have noticed in the top of the press a rubber bag. This fills with water and comes down with great force on the shape that is enclosed. When the hat is removed it seems perfect in form and well stiffened, and is now ready for the varnishing. Every hat must receive this finishing touch.

The varnish is of a neutral tint when put on hats of various colors, but the black hat receives black varnish. When the hat emerges from this process it is ready for the trimmer's department or to be packed and shipped to various places. Some of our Eastern factories send their hats as far as Cuba and other islands of the West Indies, or to Seattle and the far northwest.

If the hat is trimmed in the same factory, as a rule it is of the plainest kind, a band and rosette or other plain trimming. But each hat must be lined, some with paper, some with muslin, others with better material. This lining is put on by machine, the strips of various materials having been previously cut out by a girl in charge of the ribbons and trimming. The operators take the strips and quickly stitch them on the hats.

If, however, the hats are to be trimmed in a different factory, then we see another kind of work. For here no machines are buzzing or humming, but around various tables are grouped the milliners and trimmers. At each table are seated from eight to ten milliners and one trimmer. The milliners put on the facings and bindings, do the proper wiring of the brims, and make the folds or other necessary details. The trimmer, however, is the one who must create the desired effect. She is indeed an artist in her line, working at the most attractive designs. The real beauty of the hat depends upon her taste.

In our visit to the factory we noticed that the conditions under which the operators worked seemed favorable. The places were large, clean, well lighted, and comfortably heated. The numerous windows showed that even in summer satisfactory conditions could prevail.

As the lighter work is the only kind done by the girls and women there is no strain on the health. The sewing on of the braid, of the lining, and of the trimming are the several parts of the work performed by the girls; while the men stiffen the hats, block them, and do the varnishing. As a first class engineer is kept in the factory to repair the machines, the girls have only the task of keeping the machines clean.

Although the industry in some places is limited to certain seasons, the busiest time being from November to Easter, yet many of the factories are working on hats all the year round. While a girl is learning she is paid a small weekly wage. But as soon as she can sew the braid properly and quickly she is put on piece work, the coarser braids being given to her to sew. As she improves she may advance to the finer braids. Experienced workers often turn out ninety-six dozen hats a week. It takes between one and two years to become an experienced worker.

In the trimming department the milliners are paid a small sum each week while learning, and they receive a fair wage afterward. The trimmer has opportunity for advancement in accordance with her ingenuity, and may expect good living wages if her ability warrants.

Although in the hat making department the advancement held out is not very great, yet there are certain compensations for the seemingly narrow outlook. Among these may be listed the pleasant surroundings, the congenial co-workers, and the absence of anything injurious to the health.

In all the departments the girl having a knowledge of millinery gained from trades school or high school has a great advantage. Only those with such training or girls with natural ability and ambition can secure the better paid positions.

FELT HATS

The making of felt is a process which has been known to man a very long time—perhaps as long as weaving. The microscope shows us that hair and fur are not made up of straight strands, but that every hair is covered with small branches or prongs, and that when affected by hot water these prongs show a tendency to cling to each other. It is this clinging that makes woolen cloth shrink and makes the manufacture of felt possible.

Fur felt hats, the most common kind, are made from beaver, otter, and muskrat from the United States and Canada, nutria from the Argentine Republic, hare from Saxony, and coney from Scotland and England. When the skins of these animals are received at the factory they must first be cleaned and then brushed with a solution of nitrate of mercury, which causes the fur fibers to mat more easily. After drying they are stored in cellars, where they improve with age.

When the skin is to be used it is fed into a machine which cuts the hide into shreds and separates the fur from it. The shredded hides are sold for glue and the mat of fur is sorted for quality and color. Next it is blown through revolving cylinders to separate the hair and foreign matter from it and to blend the kinds of fur together to make the desired mixture.

It is then ready to be formed into a hat. The fur is drawn by suction to the outside of a revolving cone which is dampened. The delicate layer of felt which is thus formed has to be hardened and shrunk and worked with the hands until it is a strong "body." Some of these bodies are dyed and some are left the natural color. The next step is the stiffening, which is done with shellac imported from India. These bodies are all stiffened more or less even for the so-called soft hats. The bodies are then shaped by various machines which pull out the crown, flatten the brim, and curl it.

Now the hat is ready for the finishing, which is a more complicated process for stiff hats than for soft ones. The stiff hats must be placed in a hydraulic press, where a pressure of 240 pounds forces a rubber bag inside the crown and around the brim while the hat is held in a mold. An operation which requires a good deal of skill is rubbing the hats with emery paper to give the smooth finish we all admire.

The trimming of the hats is done by hand, excepting that one edge of the binding is sewed on by machinery. Silk bands and bows are sewed on and the leather sweat-bands sewed in place, and after a close inspection the finished hat is ready for the market. America exports a great many hats and the largest hat factory in the world is in Philadelphia.

When girls enter hat factories it is usually in the trimming department, which offers a good opportunity to those who develop skill at it. The boys learn the hatters' trade, which has several divisions. If they wish to work up to higher positions, a good education of high school grade is necessary.

SHOEMAKING

When your shoes begin to wear out you take them to the shoemaker to have them mended. You can find a shoemaker somewhere in your neighborhood, and in a few hours he makes the shoes almost as good as new. He does most of the work by hand; sometimes he hires a man to help him. He seldom or never makes a shoe, yet many of us call him the "shoemaker."

When your shoes have been worn until they can no longer be mended you go to the store and buy new ones. A salesman takes from a shelf a box containing a pair of shoes carefully wrapped in tissue paper. He shows you the different styles and fits you with the proper size. If you were to ask who made these shoes you would learn only the name of the factory in which they were made, for nowadays so many people help to make each pair of shoes that there is no real "shoemaker."

Had you lived in Colonial days the shoemaker who mended your shoes would have made your new ones as well. The first shoemaker who came to this country was Thomas Beard. He came over in the Mayflower in 1629, and brought with him a supply of tanned leather. As the colony grew, and the demand for shoes increased, other cobblers came to this country and began to make boots and shoes from the leather tanned by the colonists. In those days the shoemaker sometimes went from farm to farm, staying long enough to make the shoes for the entire family. Sometimes he whittled out a wooden last to fit the largest foot in the family, and when the shoes of that size were finished he pared the last down to fit the next largest foot. The last was thus made smaller and smaller until every foot had been fitted and all the shoes made. He did all the work by hand. At one end of his low bench he kept all his tools—awls, knives, and hammers—and his paste and blacking. Sometimes he took an apprentice to assist with the work and learn the trade. It took a shoemaker about two days, working steadily, to make a pair of coarse boots. Today, with the use of our modern machinery, a similar pair of boots can be made in four minutes.

As the country became more settled, cobblers began to set up small shops in every village and became important members in each town. After a while some of these small shops became small factories where the shoes were cut, sewed, and pegged by hand. The shoes first made in these factories were coarse and heavy, while the finer shoes were brought from Europe. Later on, skilled men came over and taught our cobblers improved methods of shoemaking, and we began to make better shoes. By and by the sewing machine was modified and used for sewing leather. With the invention of this and other machines, and with the growth of the factory system, the cobbler gradually became a shoe-mender and not a shoe-maker. Today each pair of shoes passes through about a hundred different pairs of hands and almost as many machines before the shoes are ready to wear.

In the factory the leather goes first to the cutting room. Each piece is cut separately, either by machine or by hand. The cutter lays a metal-edged pasteboard pattern on the leather and traces around it with a sharp knife. He must be very careful to keep the knife from slipping, so as not to waste the leather. Then he marks with a pencil the style and size of the shoe to be made. When fine leathers are used the cutter cuts the entire upper of the shoe, taking care that adjoining pieces match in color. The pieces are then sent to the marking table, where boys and girls mark with pencils the lines that are to serve as guides to the operators of the stitching and perforating machines. These lines are also traced around metal patterns. When the pieces are all marked they are sent to the assembling table. Here they are sorted and arranged into pairs of shoes, and the linings, which were cut at different tables, are put with them. As each pair of shoes is assembled the pieces are tied together and the bundle sent to the stitching room.

It is in this room that the shoe is really made. The men and women sit at tables or machines so arranged that each worker performs one operation on each shoe and then passes it on to his neighbor. One machine sews the seam, the next flattens it out, the third stitches the next seam, and so on. Machines even make the eyelets and lace them with cord, or make the buttonholes. Some of the buttons are sewed on by hand, some by machine.

When the shoes reach the lasting room they are first matched with the soles. They have been cut and made in another room, where the work is done almost entirely by men. The machines for doing this work are heavier and more complicated than those in the sewing room. One machine stamps out the sole, another prepares the insole, and another fastens on the arch supporter when needed. In the lasting room the insole is tacked to the last, the upper is drawn down over it and tacked to the insole, the outer sole is attached, and the upper and insole are firmly sewed together. The heels are made separately and attached after the soles and uppers have been sewed. Most of this work is done by machine, except in making finer grade shoes, when much of it is done by hand by experienced cobblers. This experience is usually gained outside, for in such a factory there is little chance to learn the shoemaking trade. Each man learns to operate one machine or to do one little process. After the shoes are made they are sent to the finishing room. Here boys and girls lace and button the shoes, clean, wrap, and pack them, and make them ready for shipping.

Employment in a shoe factory is usually steady. Since the work is paid for by the piece, the wages depend upon the worker's skill and ability to work quickly. There is slight chance for advancement, except as the worker becomes more skilful in handling his tools or in operating his machine. Any change in the work must be sought by the worker. The younger boys and girls are usually placed in the finishing room or as helpers on some of the machines. Some boys feed nails on the heeling machines and buttons on the button-sewing machines. Boys and girls are sometimes placed on the stamping machines.

Since we must all wear shoes, the man or woman who works on our shoes, whether in the shop around the corner or in the factory, is doing a good service to the community. The community recognizes this fact, and in return for the service rendered insists that the worker be protected from accident by means of safety devices and guards. It also provides for proper ventilation and lighting, and for protection from fire.

The completion of an elementary education, followed by special trades school training, will be found of great value in this as in other occupations.

TEXTILES

Did you ever think of what your warm coat or shirt is made? You know that the one is usually made of wool and the other of cotton, and that wool comes from the sheep and the cotton from the cotton plant. How then do the wool from the sheep and the cotton from the cotton plant become the cloth of your suit and shirt?

You have seen old spinning wheels and reels or have seen pictures of them. In olden times the women of the household spun the threads of cotton and linen from the cotton and flax plants by drawing out the shreds or fibres of these plants into long threads. The wool they carded or combed with a big wooden card and spun it into woolen yarn on a spinning wheel. They then wove or interlaced these threads into a fabric. Now this is all changed and the making of cloth is done in mills and factories by steam or electric power. The change has been gradual from the rude wheels and looms of Colonial times to the complicated electric and automatic machines now in use.

Today the trade of a textile worker requires him to be able to make from the raw materials fabrics to be used in dress goods, carpets, rugs, furnishings, sackings, etc. An individual with no knowledge of these materials or of the workings of the machines can go into a factory, and by hard work and application can become a proficient textile worker. To become thoroughly proficient one must learn every branch of the trade and master every step of the operations, from the sorting or grading of the wool in the raw state to the intricate workings of the machines in use.

The different branches of the textile trade are as follows: First, preparing the material for spinning; next, the spinning of the material into cotton threads or woolen yarns; and finally, the weaving or knitting of these threads into a cotton or woolen fabric.

Carding.—The materials are prepared for spinning by the "sorter" or "grader," who tears them apart and feeds them into a big machine which beats out all dirt, dust, and foreign substances. When the material is thoroughly cleaned and opened it is taken to a carding machine, which consists of large and small cylindrical rollers covered with fine projecting needle-like wires. The opened mass of fibres is here carded out by the points in the card. An attachment on this machine also rubs or rolls the fibres until they become a light rope. This thread or rope is then wound on spools or reels and taken to a spinning machine.

Spinning.—A spinning machine or mule is a long, upright, movable structure to the top of which many bobbins are fastened. By a mechanical arrangement the rope unwinds from the spool and is twisted, stretched, and wound on many spindles ready to be woven. In this process it is the work of a beginner to see that the bobbins in the frame are kept filled and that the empty bobbins are removed. This is called doffing. A boy or man who is known as a "doffer" runs along in front of the spinning machine when the machine stops, removes the empty bobbins, replaces them with filled ones, and sees that the frame is continually replenished with fresh bobbins. This must be done very quickly. This is one of the first steps the apprentice takes in acquiring a knowledge of the business.

Weaving.—The yarn is now ready for weaving. The weaving is done by a machine called a loom. In the weaving the threads for the length of the cloth (the warp) are wound around the uprights of the loom frame, and the short threads (the woof) are on the bobbins at the sides and are carried backward and forward in a shuttle as it passes over and under the warp. The weaver takes care of his looms while they are working; he sees that the yarn does not break, or if it does break that it is tied up properly; he replenishes the boxes with bobbins of proper color. As a weaver advances in his work he is able to weave different designs and color schemes in his cloth.

Knitting.—Hosiery, underwear, and sweaters are made by a process known as knitting. This, like the spinning and weaving, is performed with the aid of machines, so that the work of the operator is rather mechanical.

Mill and factory work is almost entirely indoor work. It is not considered a dangerous occupation, but accidents do sometimes occur. Injuries are most frequently caused by the hands or hair of the operator getting caught in the belting of the machinery. The worker may also be hurt by being struck by the shuttle as it moves rapidly backward and forward. Girls are not allowed to wear thin, loose dresses or to have their hair hanging loose. Safety devices are generally attached to the machines and rules are enforced in regard to the dress of employees.

The making of cloth affords employment during the entire year. The working hours are usually fifty-four a week, except where the Saturday half-holiday is in force. The older employees are paid according to the amount of work done. A beginner must serve as an apprentice.

Workers seldom shift from one department of textile manufacture to another, except in cases where they are found unsuited to what they are doing. Each change means a money loss to the workers, as time is required to learn the new operation.

An employee who has the desire to advance will find the opportunity of doing so. Without a good general education and technical training, however, one cannot advance very rapidly nor reach the highest positions. If he is quick and accurate he soon learns to operate the different machines, and thus becomes familiar with the various steps of the work as well as with the different raw materials and the grades of cloth produced. Through mastering all branches of the work the apprentice may become a journeyman and in time an expert worker.

The employees of a textile mill have many chances of companionship. They work side by side and a feeling of friendship soon springs up. Many of the newer establishments have restaurants where food is served at a low cost, and rest and recreation rooms where the workers may gather for relaxation and entertainment. A trained nurse and skilled teachers are often employed to look after the welfare of the workers.

The textile worker must be strong and have powers of endurance, for the greater part of the time the operator stands at the machine, working with both hands and feet while he watches the shuttle and adjusts the thread. He must constantly watch for broken threads and foreign substances, as the slightest inaccuracies will make a rough place in the cloth. Little attention is paid to personal appearance, excepting that a careless appearance in the worker usually means careless work.

The worker who has received a technical training and a general education has a distinct advantage over the apprentice, who must begin at the bottom rung and both learn and produce at the same time. Anyone entering the mill without some technical education, as well as general education, has a handicap which can only be overcome by careful attention to the work during the day and by hard study at night. Few people are capable of doing this. After completing a high school or trades school course a boy or girl will find much yet to learn if ambitious to hold a high position in the textile industry.

LAUNDRY WORK

Instead of washing all of their clothes at home many people nowadays send them to a laundry, where the work is done by machine instead of by hand. Even from homes possessing electric washing machines certain articles are sent to the laundry because they starch and iron them as well as wash them. Many girls are employed in this kind of work.

The soiled clothes are collected by the driver of the wagon and are brought into the laundry, where the bundles are undone and the clothes counted. The garments are then marked, so that after the work is done each person will get back his own clothes. Girls who do this are called "markers." Next the pieces are sorted into piles according to color, texture, etc. The work of the "sorters" is disagreeable because it involves the handling of soiled clothes, but it requires care and knowledge, so that it is often the most highly paid of all.

All of the articles, except perhaps a few very fine pieces done by hand, are washed in big machines operated by men. These machines consist of huge double cylinders. The inner one, which holds the articles to be washed, is perforated. In these machines the articles are immersed first in cold water for five minutes, and then in lukewarm water, soap, and soda for twenty minutes. The cleansing process is then completed by half an hour in boiling water to which soap, soda, and a bleaching liquid have been added. Then follows a rinsing through three waters, in the last of which bluing has been dissolved. Close to the washing machines are other receptacles in which the washed clothes are placed and revolved rapidly until they are almost dry. These machines are also run by men.

After the clothes are washed and partly dried they are shaken out, a process done by the beginners in the trade. Then all of the flat pieces are fed into a machine called a "mangle," on which are two big steam-heated rollers that do the ironing. The "feeders" must be careful to see that each sheet or towel or handkerchief is flat and smooth before it goes into the machine. Girls who catch the things as they come out fold them and lay them in piles. They are called "catchers" and "folders."

Articles to be starched go to the "starchers," who do their work either by hand or by machine. In case machines are used many of the articles must be rubbed smooth by hand, so that the gloss will be evenly distributed. The stretched clothes, which must be thoroughly dried, are hung on racks which move in and out of the drying room. Then they are dampened by being placed under sprays or in a dampening machine. After this they are ready to be ironed.

There are many different kinds of machines used in ironing, adapted to collars, cuffs, bosoms, yokes, neckbands, bodies, and sleeves of shirts, as well as to underwear, skirts, etc. These machines, run by women, are usually operated by a foot treadle, which brings down on the garment a heavy steam-heated press and completes the process in one operation. The "machine ironers" become extremely tired because of the strength required to press down the treadle, so this is not a very healthful occupation for girls.

There are always some "hand ironers" in a steam laundry, because it is impossible to do many kinds of women's and children's fancy clothes in any other way. Women who are skilled in this can always find employment. Often the laundry employs "menders" for sewing and darning. This is not expert work, however, for owing to the demand for speed in getting the work out, no great care is taken. After the clothes are washed and ironed they are taken to another room, where the "wrappers" get them ready for delivery.

None of this work, except perhaps sorting and hand-ironing of fine pieces, is highly skilled. The wages paid are correspondingly low.

The hours of work in laundries are quite different from those in other occupations, for the work collected on Monday morning is not brought into the laundry in time for all of the workers to start early. So the general custom is for them to come in at 2 o'clock, making up the lost time in the evening. On the other days, except Saturday, the usual working day is ten hours. While the laundries have a pretty steady business throughout the year, the rush season is in summer, from about July 1st to September 15th, when wash clothes instead of woolen ones are being worn.

Although girls of sixteen years of age are employed by the laundries, it is not desirable for them to enter the trade so young. Nor should any young woman engage in it unless she has an unusually strong constitution. Continual standing is required in almost all of the processes and in many of them the work is heavy, particularly on the ironing machines operated by foot treadles. While the workrooms are, as a rule, clean, there is always the disadvantage of continual steam in the atmosphere. Some establishments have arranged exhaust systems to carry this off, but many others have not, so that the warm moist air tends to lower the vitality of the workers.

THE JEWELER'S TRADE

The desire to possess beautiful jeweled decorations is keener today than it has ever been. Women and girls want rings, brooches, bar pins, jeweled collars, pearl necklaces, pendants, earrings, watches, mesh bags, lorgnettes, novelties, fans, combs, and hair ornaments. Men and boys want scarf pins, watch chains, collar buttons, rings, watches, cuff links, studs, dress sets, pencils, knives, and match-boxes. To satisfy the desire for these beautiful things is the work of the jeweler.

The metals used in making jewelry are gold, platinum, silver, copper, and the alloys. The chief stones are the diamond, emerald, pearl, ruby, sapphire, amethyst, coral, garnet, opal, topaz, turquoise, amber, and agate. There is almost infinite variety in the forms and decorations of the various articles. They may be elaborately designed and set with precious stones or plainly chased and simple. But the one requirement of all jewelry is that it should be beautiful.

The jewelry industry requires the work of the following highly specialized men: first, perhaps, would be the diamond cutter; second, the platinum worker; third, the gold worker; fourth, the die-cutter and stamper; fifth, the chaser and engraver; sixth, the stone setter; seventh, the polisher; eighth, the enameler, All of these are distinctively jewelers, and to this list must be added the watch-maker, the clock-maker, and the letter-engraver as distinguished from the ornamental engraver above referred to.

The work of the jewelry industry falls into two classes: craftsman jewelry and commercial jewelry.

Craftsman jewelry is made by hand from silver and copper, with simple tools, but with much attention to design. It is ornamented with the softer precious stones, sometimes irregular in shape and unpolished. Inlay and enamel are also features of this type of jewelry, which is often massive and somewhat barbaric.

Nearly all the jewelry sold at a moderate price is now made in large factories by machines. This is commercial jewelry. Handwork is not entirely done away with, but the main processes are carried out by machinery, which is very wonderful in its perfection and delicate construction.

Gold jewelry may range in fineness from twenty-two karats, which is found in old pieces, to eighteen and fourteen karats, which are the accepted standards of gold jewelry in America. Ten-karat gold is made, but as more than half its weight is alloy it should not be called solid gold; although it is frequently stamped as such.

For the purpose of making gold-filled jewelry a thin shell of gold is stamped with the pattern and this shell is backed by a baser metal, after which the back is covered with an inferior quality of gold.

Rolled gold, or rolled plate, consists of exceedingly thin sheets of gold made to unite by pressure with a sheet of composition. The plate is rolled until it may become the thousandth part of an inch in thickness, but even then it will not tarnish if it is more than fourteen-karat gold. The plates are then annealed and polished on the gold side.

When we speak of gold-plated jewelry we now mean articles which have been electroplated. This is a modern method of covering articles with a very thin coat of gold by means of a current of electricity.

Cutting is the most important treatment given to the precious stone, the beauty of which depends to a large extent upon the skill and accuracy of the cutter. The cutting of a valuable stone from the rough form is a highly skilled operation, and great delicacy of touch as well as judgment on the part of the cutter is required to produce the final treasure.

On many pieces of jewelry we see colored decorations which look like precious stones or colored glass, we cannot tell which. These may be cheaper varieties of enameled jewelry. The decoration is made of melted glass, which is poured or spread upon the metal in very small quantities and then put into a hot oven to be "fired," or hardened on to it.

The centers of jewelry manufacturing in the United States are located in Newark, New Jersey; Providence, Rhode Island; and New York City. Philadelphia has a few large jewelry factories, usually connected directly with the big retail stores. These factories are generally of the better class, manufacturing special goods, and attracting to Philadelphia only such workmen as can do this class of work. There is not a great quantity of commercial jewelry made in Philadelphia, and consequently there are very few women employed in the industry there.

Besides the jewelry shops of the better class, all of which are well located with regard to light and air, there are shops conducted by men who have gone out from one of the larger shops, and have hired one or more assistants and an apprentice or two, and whose quarters are cramped and unsanitary.

For many years there has been a great scarcity of boys for apprentices, due to the fact that in foreign countries boys with an aptitude for this kind of work have begun at an early age to learn the trade, have developed step by step, and have finally come to our own country. Moreover, it has been difficult to procure here boys who are willing to devote the four or five years necessary for training in order to compete with the carefully trained and frequently expert foreign workman of his own age.

Today there are practically no apprentices among the watchmakers and clockmakers, and very few among the engravers. In the jewelry industry proper, however, boys while not regularly apprenticed begin at about sixteen by doing minor tasks, such as sawing out blanks, and as they become more expert are developed into bench workmen. In some shops boys are taken as apprentices. The wages are advanced according to their progress in the various grades of work. Advancement is rapid after the men become efficient in the higher class of work and the wages are high.

To become a fine jewelry workman or engraver it is absolutely necessary that the boy shall have some talent for design and some idea of proportion, otherwise his time and efforts in this pursuit are wasted. Platinum jewelry, for instance, is made of the most delicate tracery, while all types of engraving and chasing are largely freehand work which must be symmetrical and correct. The handling of the precious metals and the setting of jewels give great responsibility to the work, because upon the proper construction and workmanship of the various pieces depends the safety of the gems. Good eyesight, a steady hand, accuracy, speed, neatness, honesty, dependability, quickness to grasp the instruction given by the foreman or the one directing the work, and manual skill are the requisites for promotion. Higher education is essential if one is aiming to eventually conduct his own business or to become an expert salesman.

THE FOOD TRADES

MEAT PACKING

There are many different kinds of work in the meat packing industry, including virtually all of the professions, trades, and various skilled and unskilled occupations. Among the departments are most of the branches of engineering, chemical research, packing plant operation, advertising, the marketing of products, the use of by-products, foreign trade and exports, transportation, credits, sales, and administration. In an organization of such size it is, therefore, an easy matter for a boy or young man to choose a career.

To the youth who has just completed college, without having taken professional work, one of these companies affords fertile ground for success. Courses of training for the young college man are established which will enable him to obtain a practical education in all branches of the packing industry within the minimum amount of time. This training is preparation for future executive work and attractive rewards. The young college man is hired as a student and placed on the payroll at a wage which is self-supporting at the outset. If he is successful in passing through this period of training with a record of grit, ability, and a liking for the industry, he is well on his way to a bright future.

For the boy who cannot aspire to a college education there are also opportunities, provided he has a fair education at the start. If he is paid to use his physical strength in a more or less mechanical way, there is but little chance for his advancement.

The many occupations which enter into the meat packing industry are discussed elsewhere in this book. It only remains to be stated that while employees of large corporations lose the benefit of personal contact with the owner of the business, they have the distinct advantage of opportunity for advancement within the organization, if ambitious and able.

BAKERIES

Many people form their idea of the baking business from the corner "bakery" near their home, but, as a matter of fact, the modern wholesale bakery is one of the big industries of modern times. In Philadelphia, for instance, one bakery alone produces more than one million loaves of bread a week.

A business of this size is necessarily well organized, and offers many opportunities for advancement to an ambitious boy. The boy entering the baking business has his choice of three principal kinds of work:

1. Manufacturing—actual mixing and baking of bread.
2. Office work—accounting, etc.,—open to both boys and girls.
3. Selling.

In this as in many other industries there are great chances for advancement for the ambitious boy who is willing to work and not ashamed to begin at the bottom. Some of the most wealthy and successful men in the baking industry today started as "pan boy"—the boy who greases the bread pans. But, other things being equal, the boy with a fair education will advance faster and go further than the boy who leaves school too soon, and for this reason: The baking of bread in a modern bakery is reduced to a science; each ingredient is tested and analyzed to see if it comes up to a certain standard. Every step of the baking process is done scientifically. The mixing of the dough, the temperature and humidity of the proving room (where the dough is set to rise), the temperature of the ovens—all these things must be controlled to perfection. The men in charge of these various processes must be experts in their lines.

This is where your education becomes of practical use. For one of the chief advantages of all your schooling is the mental training that enables you to tackle a new problem and master it quickly.

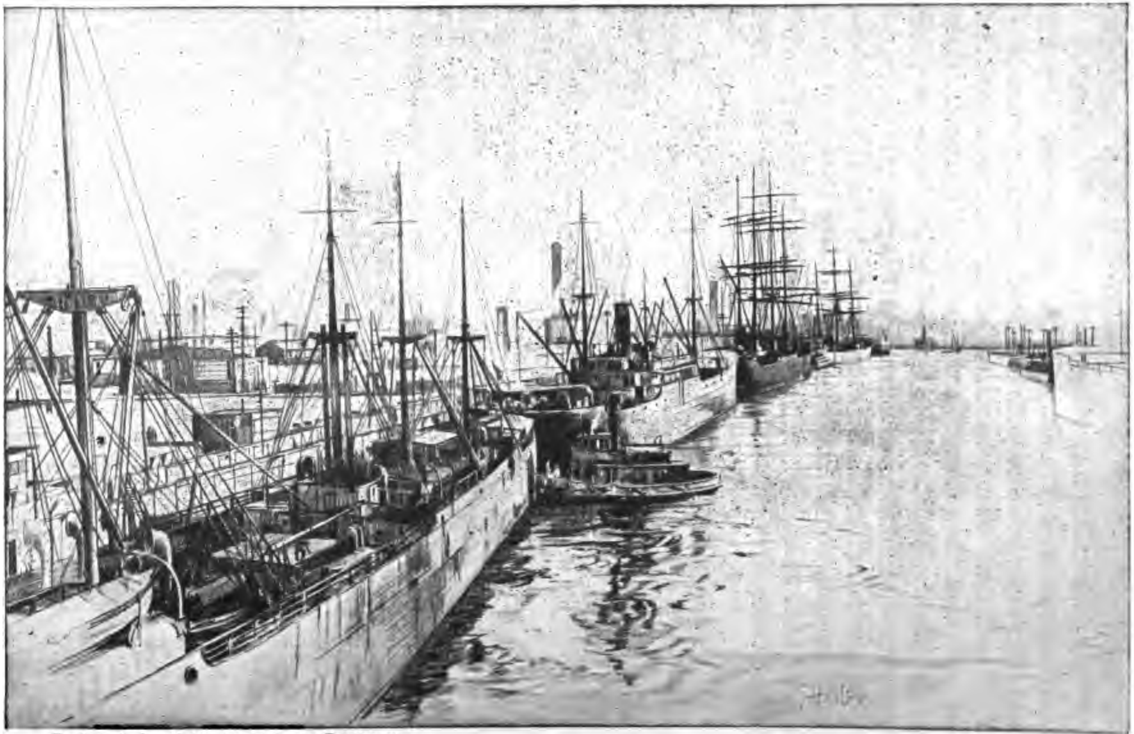
In the office and sales departments there is equal need for boys and girls who are trained to use their minds; they soon outstrip their less fortunate companions. So if it is your ambition to enter the baking industry, by all means prepare yourself for rapid advancement by staying in school as long as you can.

CONFECTIONERY

You love candy! Every normal boy and girl does. To see it made is most interesting. To take some water, eggs, and sugar syrup, and turn them into marshmallows; to take a cocoa bean (they are like coffee beans) and help make it into chocolate paste, and then to use this chocolate in covering delicious centers; to use your fingers cleverly in packing with great care and some artistic ability, and to tie beautiful ribbons into bows would seem to be interesting work.

When you start in the chocolate dipping department as a learner you receive instruction in the art of dipping chocolates. In a short time you are given a regular place at one of the tables and paid on a piece-work basis. Then again, you may be put in the packing department and given the position of packing small boxes of marshmallows, mints, etc. As you improve, you will be given the larger boxes to pack, for which you are paid more.

While this work seems very interesting, and is so at first, no boy or girl should forget that in this industry as in most others the work is highly specialized and a person is usually kept working at one process unless his education and training warrant his transfer to other departments for experience. Even the most interesting things become monotonous if repeated again and again with little hope of change. Conditions in the confectionery industry, however, are about as good as in most factory industries.



By Permission of Atlantic Refining Company.

Oil Ships on the River.

II. COMMERCIAL

DEPARTMENT STORE EMPLOYMENT

THE department store is a complex organization in which are represented many occupations requiring people of many types and of abilities as varied as the occupations themselves. The store is a big community, requiring the closest co-operation on the part of its many workers in order that the huge machine may run smoothly and serve the public successfully.

There are usually four or five main divisions of department store work, each offering employment of many kinds and grades.

Executive or Management Department.—This department works under the leadership of a general manager and his assistant floor managers or superintendents. There is generally an office manager under whom are bookkeepers, stenographers, chief clerks, office clerks, office boys and girls. Excepting the office boys and girls this is a department of trained workers, and as is the case in all skilled occupations the workers are paid in proportion to their experience, training, and ability. The duties of the office boy or girl are chiefly going errands inside and outside the building, sorting slips, and perhaps answering the telephone. Advancement to the desirable office positions can come only through training and experience.

Merchandizing.—This department of buying and selling is the most interesting to the great majority of department store employees and offers the best and most varied opportunities for advancement. Its leading spirit, the merchandise manager, must be a person of superior business and executive ability, for upon him rests to a tremendous extent the success of the department. Immediately responsible to him are the department or section buyers and assistant buyers, who must be men and women of good judgment, prudence, and foresight, thoroughly familiar with the merchandise of their sections. They must know kinds, qualities, prices, sources of supply, and market conditions. They must be able to anticipate the wants and needs of the public and know what will take the public eye to the extent of opening the public pocket book. Very large salaries are paid to successful buyers with an established reputation.

Next to the assistant buyer is the head of stock, whose duty it is to confer with the buyer, to see that a proper supply of fresh, attractive stock is always at hand, and to see that regular orders are placed and filled. There are comparatively few of these positions and they are obtained only by years of faithful service on the selling force.

The most important factor in moving these great stocks of merchandise is the salesperson. A large sales force is kept busy attending to the needs of the thousands of customers who daily visit these great stores. This occupation is treated in detail in the story of Salesmanship and should be read in this connection.

Inspectors and cashiers also are classified here. This work is almost exclusively for girls. The duties are to compare merchandise and sales checks received from the salesperson, to see that the money agrees with the check and the amount of sale, to verify charge accounts, and to send merchandise to the delivery department or to wrap and return it with sales check or change to the salesperson for delivery to the customer. The work requires care, accuracy, and speed and offers promotion to the position of junior saleswoman.

The work of the stock boy or girl, as the name implies, is the care of stock, dusting, boxing, folding, or hanging up stock as may be required; bringing fresh goods from the stock rooms or work rooms and examining it to see that there are no missing price tags, buttons, loose trimmings, etc. The stock boy or girl must do everything possible to save the time of the salesperson; the stock must be kept up by consulting department lists. The requirements are good powers of observation, a good memory, and willingness to work. Advancement is made to junior selling positions.

The youngest workers in the department stores are the messengers. They are the boys and girls who leave school at fourteen years of age and have no experience or training. They run errands for nearly all persons in the offices or on the floor of the store, take checks to be signed, orders to be certified, carry transfers, take articles to desks to be wrapped and return package and change. They must be able to receive and execute oral directions accurately and promptly. They must learn the location of the different departments of the store and the names and positions of the heads of departments. If intelligent and earnest these boys and girls advance gradually to the better positions; but many of them, released from school, do not realize the importance of improving themselves by study and a diligent application to business and gradually drift from one job to another.

The pay in these positions decreases as you go down the list. Advancement from the poorly paid positions comes slowly and only as a result of diligence on the part of the worker and hard work to secure education and training.

Advertising and Publicity.—This department renders very important service to the store and to the public, and offers excellent opportunities to the highly trained and progressive worker. These opportunities are presented in the story of Advertising and need not be given here.

Delivery.—This department gives employment to physically strong men and boys who do not like indoor work and who cannot make a success of mechanical, clerical, or selling positions. It might offer a chance for a delicate boy to grow strong through the outdoor exercise, provided he could handle the lighter kinds of merchandise. It offers little opportunity for advancement, and, as in all unskilled occupations, the wage is low.

Miscellaneous.—Tailors, dressmakers, milliners, seamstresses, lunch room employees, engineers, electricians, elevator operators, janitors, and cleaners are employed in large or small numbers in this department. The wages are about the same as those paid for similar work in other business organizations.

During the greater part of the year the department store employee works under excellent conditions and with pleasant associates. In busy seasons, however, such as the month of December and about Easter time, the work is very taxing. Great crowds throng the aisles, making the atmosphere heavy and hard to breathe. Customers frequently become exacting and impatient because of delays or other inconveniences which the worker may not be able to avoid. Special sales days also make a heavy demand upon the physical strength, good temper, and adaptability of all department store workers.

Nevertheless, there is no place better adapted to a training in getting on in the world. The continued contact with all sorts of people is most valuable in character development and in sharpening the powers of observation. Some stores offer valuable educational advantages, such as classes in English, arithmetic, typewriting, stenography, merchandise and salesmanship. Employees are excused from duty to attend these classes. The lectures given by the buyers to the salespeople are very interesting and helpful.

Intelligence, enthusiasm, and hard work are necessary to progress in a department store as they are in all fields of human endeavor. The cultivation of these qualities, plus good health and a pleasing personal appearance, will do much to start the employee on the road to success and to open the way to opportunities for larger service. Moreover, if one is to advance far in any field of commercial activity in these days of keen competition, he must have at least a high school education.

SALESMANSHIP

Have you ever traded a dozen "commons" for a beautiful glass agate, or a stick of candy for a fine bouncing rubber ball? Did you know that in doing this you were practising the first principles of salesmanship? This desire to barter, to exchange something which we have for something which we need or want, is as old as life itself. We know that from the very earliest times man bartered those things he had and did not need for the things he most desired. In those early days men lived very simply and their wants were few and easily supplied. Growth in population created an increasing demand for necessities of many kinds and a corresponding increase in the collection and production of these things. It soon became quite as important to distribute these commodities cheaply and quickly to those who needed them and this gave rise to a system of trade.

The traders of these early times had to collect as well as distribute their wares. The value of the article was determined chiefly by the necessity for having it or by the desire for possession; the exchange of goods depended upon the desires of the two parties engaged in the transaction, and the skill displayed in bargaining.

The establishment of town and cities and a more complex mode of living stimulated this instinct for trading. The old methods of barter soon proved too slow and unwieldy, making it necessary to have some accepted standard. Money came into use as a satisfactory "medium of exchange" and created our now familiar terms of buying and selling, cost and selling price. In this way our present great commercial system gradually evolved.

The law of supply and demand is the life of this interchange of commodities which we call commerce. It necessitates continuous change of ownership from field to mill, from mill to factory, from factory to store, and from store to home. This change of ownership is effected by buying and selling, and provides occupation for numbers of people who have become experts in the art of salesmanship.

The selling of goods is one of the chief factors in the conduct of a successful business; keeping the goods moving is equivalent to keeping the business going. The qualities required for successful salesmanship are much the same as those required for any other important work, with perhaps the addition of the ability to get along well with people. To be a successful salesman one must enjoy meeting and working with people, and must cultivate an active interest in their needs and desires. The essential qualities of a good salesperson are good health, cleanliness, and a pleasing appearance and manner. Neat and appropriate dress and refinement of speech must be habitual. A good memory, well developed powers of observation, natural kindliness, cheeriness, and unfailing courtesy are valuable assets.

There are many opportunities in the field of salesmanship, such as retail selling, wholesale selling, specialty selling, selling by mail, selling by agency, selling of insurance, bond selling, etc. Success in any of these fields depends upon trained ability, conscientious effort, and persistence.

The average selling position in a retail store is perhaps more valuable as a means of training and as a stepping stone to the better retail and other selling positions than as a permanent occupation. The big department stores require a large selling force at all times and a greatly increased number during the very busy seasons. It is comparatively easy at such times to obtain one of these selling positions; to retain this place and win advancement is, however, a different proposition. Every salesperson must make good to the extent of selling enough merchandise "to cover the amount of salary," that is, a certain fixed percentage of the total amount sold each week or month should at least equal the salary received. If the salesbook does not show this amount regularly there will be no further need of that person's services. The duties of retail selling include the thorough study of the merchandise to be sold, for goods cannot be sold intelligently by a person unfamiliar with their kinds, qualities, and uses. Any one can, of course, hand to a customer an article marked twenty-five cents and take twenty-five cents in return, but that is not salesmanship. Salesmanship is the exchange of goods for money with profit and satisfaction to both buyer and seller. The interests of the purchaser must always be a consideration in the sale which is productive of the best results to the house. The proper care of stock and its arrangement must be understood and practised. The salesperson in the department store must be acquainted with the location of the other departments of the store and of the general character of the merchandise sold in each, in order that valuable suggestions may be made to the customer and intelligent directions given. The average pay in retail stores varies according to experience and service; there is sometimes an additional percentage on sales over a certain amount. The pay cannot be said to be more than mediocre for any but successful salesmen and saleswomen with training and aptitude for the work.

Wholesale selling offers excellent opportunities with good salaries to capable persons who are interested in that field. Success as a traveling salesman requires unusual tact and business ability, self-control, and a genius for getting on with people.

Advancement in all of these departments of selling depends upon ability and experience, upon interest in the work and a desire to succeed. The causes of failure are indifference, dishonesty, and lack of application and interest.

The best preparation for salesmanship is a good general education. A salesman (or saleswoman) requires a fund of general knowledge in addition to a thorough knowledge of the goods he wishes to sell. Without a good education he will not be able to meet many business men on an equal footing. Many high schools and colleges give excellent courses in salesmanship and business methods. The salesman must live a clean, healthy life, must be mentally and physically alert and attentive to business. The work is enjoyable and offers opportunity for self-improvement and for public service. It also has educational value. The salesman introduces and explains to the consumer the latest products of manufacture, the newest inventions, and all the recent time and labor saving devices as they appear upon the market.

This brief study of salesmanship shows us that it has many advantages. It offers both indoor and outdoor employment to men and women. Working conditions generally are excellent, the hours are good, and the associations are pleasant. Success in this field requires the study of self along with the study of merchandise and business methods. The salesman must measure up to the standard set by the public; consequently, improvement in his work is reflected in his own character and personality. It has been truly said of this occupation that in enjoyment of work, in personal and material gain, "He who serves best profits most."

GENERAL CLERICAL WORK

Mary Smith looked wistfully at Mabel's new hat. "I wish I had a new one," she said.

"I used to feel as you do before I graduated from high school and began to earn my own money," Mabel answered. "Your time will come—stick to your lessons now and learn all you can."

But Mary thought little of her sister's advice, and more of the pretty hat. At night she asked her mother if she might not have a new one.

"No," said her mother gently. "I cannot afford it—it costs a great deal to keep all you children in school."

"Then, Mother," begged Mary, "may I stop school and go to work?"

Her mother laughed. "Why, child, you haven't finished grammar school. What kind of work could you do?"

"Office work—lots of girls do it who are no further in school than I am."

Her mother shook her head. "No, you may not leave school," she said, "but when summer comes you may work during the vacation, if you can find something."

"Well," thought Mary, "I shall get such a good position and do so well that Mother will not make me go back to school."

So when June came Mary looked for a job. Before long she was discouraged because no one seemed to want her. At last a friend of her father's told her to come to his office. There she answered the telephone, opened his mail, put his letters away in the files, and when he was out she told the people who called when they might find him. Once he had her address some envelopes, but when he saw the sprawling, childish hand-writing, and the slowness with which she wrote, he finished them himself and had her run out to the letter box with them that they might go in the afternoon mail.

One day he said to her, "I shall not need you after this week. My work is getting too heavy, so I have engaged a stenographer."

"But I could do more, Mr. Anders," Mary said eagerly.

He laughed. "You go back to school," he said. "You mean well, but you don't know anything. When you have been in school five or six years longer and have learned to write a good business hand, as well as to spell, to punctuate, to form sentences, to keep wide awake on what is going on in the city and country, and when you have also had some training in stenography and typewriting, you will be very valuable in an office, but now you cannot do enough to pay me for employing you."

So Mary left and went sadly home. On the way she met a classmate of hers. "Are you working, Mary?" asked Sarah. "I have a good job and I can get you one if you like."

Mary jumped at the chance. "What is it?"

"It's clerical work," said Sarah, "at Dubent's. It's easy."

The next week Mary started on her new work. She was in one of the offices of a big manufacturing plant. Here sometimes she had to write all day long, copying the sales checks, putting down in a book the amount of goods cut, the quantity ordered, etc. Sometimes she pasted samples on cards, added the number of the sample, then put them in envelopes and addressed them. It was very monotonous work. "Shall I always have to do this?" she asked her employer.

"Why, what else can you do?" he asked.

"O, most anything," she answered.

He shook his head. "There is nothing else I'd trust you with," he said. "And besides, I don't think I'll need you any more. This extra work is done and the regular girls can take care of the business."

Again Mary was without work. August was about over and school time was near. She began to wonder whether perhaps it would not be better to go back to school as her mother wished. Then one day she talked over her experiences with her sister Mabel.

"It is always that way, Mary," Mabel said. "You might get a position that you could keep longer than these, but without further training you would never get anything but monotonous, uninteresting work. And you would never be paid much for it—there are so many girls and boys with good education who want clerical work that a girl with as little schooling as you have would always be overlooked except for work that is undesirable or poorly paid. Moreover, when business was poor you would always be the first to be laid off. If mother feels she cannot afford to keep you in school the best thing to do is to try to get work in a place where you can learn something, and so be advanced. There are some places, like the big department stores, where they give you a chance to study and learn to improve yourself. You would, of course, have to take poorly paid, uninteresting work to begin with, and you might have to keep it for some time. In a department store, if you wanted clerical work they would probably put you to sorting the checks which the salesgirls make out as they sell things. Then they would let you paste the two parts of the checks together.

"If you did not get discouraged and leave because you disliked this work so much you might go on to filing—that is, putting the mail away by a certain system. In Grandfather's day the average business man handled all of his own correspondence, and the question of filing was thought of no importance. Letters were pushed into drawers, or even into trunks and barrels, and when wanted could never be found. Today our leading business men employ special file clerks. But for this important work they want specially trained people, who have had a high school education. So you see that your chances for getting a position as file clerk are not good.

"Then they might teach you to use the billing machine, a machine with keys somewhat like a typewriter. It is used to make out the bills of the customers. The adding machine comes next. All you would do would be to push the keys that were marked with the figures of your sum and the machine would add them for you. If you stayed long enough, and were faithful and worked hard, you might be given a chance to learn the use of the comptometer, another machine with keys which is used for figuring. Each one of these things requires more skill than the last, and, of course, commands more pay.

"For the girl who has the patience to stay for a number of years there is a good opportunity so far as the money is concerned, but you have probably noticed that all of the work I have mentioned is mechanical—that is, it requires very little thought and so is not very stimulating. Moreover, if you should wish to change your position, or move to a smaller city, there would be very few positions of a kind you could fill open to you. Your training would have been too narrow to count for much outside of the business in which you were trained. The girl who stays in school, on the other hand, and perseveres until she has a good sound education, can skip all those trying beginning steps and start almost at once in practically any place, with work that is interesting and well paid."

Mary thought this over many times during the week that followed. As she looked back at her summer's work and thought of the hundreds of samples to be pasted, or envelopes to be addressed, and then pictured a future of not a month or two but years of the same thing, she knew she would never be happy in that kind of work. So when school opened Mary was there with a smiling face and with an enthusiasm for her studies which she had never felt before.

STENOGRAPHY AND TYPING

Mary's attempt to earn her living had started her thinking, and when she graduated from the grammar school and registered for the commercial course in high school she asked her sister about the positions that such a course would open to her.

"I don't see," she said, "why I should not go right to business college and take business subjects there. It wouldn't take me nearly so long."

"If you want to be a typist and nothing more," answered Mabel, "I should say that you might do as well at business college as at high school. For a typist sits at her machine all day and just copies page after page on the typewriter. You feel like a part of the machine, just pushing the keys all day and never doing anything else. It is like most things that come so easily—it is not very worth while.

"But that isn't all, you are much more likely to be a good stenographer if you are a high school graduate than if you are not. A great many people think that all a stenographer has to do is to take down in shorthand the letters her employer dictates to her and then write them out neatly and accurately on the typewriter. Of course that is a big part of the work, and if a girl has not much education besides her stenography and typewriting it may be all she ever gets to do. Even then, to take down accurately what her employer says, to be able to correct any mistakes in grammar he may make, to be able to spell the unusual words he may use, to punctuate his letters properly, requires considerable training in English. A well trained and capable girl gets more interesting things to do. For instance, her employer will say, 'Here is a letter from F. E. Jones of Chicago. Write him that his order will be attended to immediately, that it was delayed by the late arrival of the wool.' Then the stenographer composes her own letter to F. E. Jones. Sometimes, too, when she has proven herself capable, he lets her sort the mail in the morning and answer any letters about which she knows, saving him the trouble of ever seeing them. When she can do this she is really his private secretary. But no girl can do it unless she is very well trained in English. She must know the exact meaning of the words that are likely to come up in business, and she must be able to express her meaning briefly but exactly and smoothly, so that the letter she composes may be as good in every sense as the one her employer would write. Another thing, she has to keep her employer's business in mind for him. Details that he forgets she is supposed to remember. Keeping wide awake about things that are going on in other places in the same kind of business in which he is engaged is invaluable, and to keep up on what is happening in the city and the country at large is good and is a trait that only well educated girls are likely to have.

"Some girls nowadays are learning to take their dictation on a machine, instead of in shorthand. This new method is called stenotypy. It takes no longer to learn than stenography, and it has the advantage of being more rapid, but it has the disadvantage that the stenotypist must buy her own machine. Frequently, however, a stenotypist is paid a higher beginning wage than a stenographer, so that this is not so great a disadvantage as it seems. Sometimes a girl is called upon to use the dictaphone. This is a machine into which the employer dictates his letters and which records them on wax cylinders. The stenographer can then turn on the machine and write out the letters on the typewriter at any time, whether the employer is there or not.

"But to write letters is often not the only duty of the stenographer or stenotypist. She may have to do filing, especially if she is in a small office. She may have to use the adding machine, or the mimeograph. The latter is used in case a great many copies of the same letter are to be made. The stenographer puts a wax sheet into her typewriter and writes the letter on that. Then the wax sheet is put on the mimeograph, inked, and as many copies of the letter made from this as are wanted. You learn to do all these mechanical things in a very short time at high school.

"This variety of work is, of course, interesting. But as a girl becomes especially valuable as a stenographer a less valuable girl is usually put on the mechanical work, so that the stenographer may devote her time to the field where she is so useful.

"The opportunities for a good stenographer are unlimited.

I spoke of the fact that she might become private secretary. For this she needs, in addition to the ability to write letters, which I have already mentioned, a good business head and a pleasing business-like manner. For she will have to meet her employer's clients and be able to deal with them in a business-like way. Of course it needs a girl who is very intelligent and very wide awake to be able to do this, and of course it is the kind of position that many good stenographers hope to hold some day.

"Then there is the public stenographer. You must have great speed, as well as accuracy, in your work to be one. If you do not have money enough to open an office of your own you can hire desk room in an office building and put in your own desk and typewriter, mimeograph, and perhaps multigraph machine. Multigraphing is something like printing. You set your letter up in type in the machine and then run off as many copies as you choose. It is harder to learn to do than mimeographing, but it makes a very pretty letter when it is done. Public stenographers are very much in demand and generally charge high prices for their work, for they are called on for odd jobs which must be done in a hurry.

"Another well paid position for a stenographer who has speed is that of court stenographer. This position is held oftener perhaps by men than by women, for the strain and responsibility are great. Much of the work is done at night. It consists of taking the testimony of witnesses in court cases, records that must be absolutely accurate."

"Don't boys ever become stenographers unless they have court positions?" interrupted Mary.

"Yes, but not nearly so often as girls. Many young men hold positions as private secretaries, but ordinarily a boy, if a stenographer at all, looks at his position as a stepping stone to something else. It offers a good opportunity for boys to enter offices and learn almost any kind of work. Many successful business men—bankers, brokers, and merchants—began their careers as stenographers. It is an accomplishment that will be useful to any man, no matter what line of work he may wish to pursue in later life."

BOOKKEEPING

A bookkeeper's work is to record in a systematic way all the transactions in any business. He must make a record of all the money that is taken in by the business and from what sources it comes. He must also record all the money that goes out and for what it is spent. Then the owner can turn to his books at any time and see who owes him money, and how much, or how much he himself is in debt to outsiders. In the end, the books will show the loss or the gain in each department of the business. This is most important, for if it is found that one department is always running at a loss the owner knows that the methods of that department must be changed. He will watch it through his books until it shows a gain rather than a loss. Of course, it is the bookkeeper's work to make out bills, and if the business is small and there is no cashier he may have charge of the money. At any rate, he will probably have charge of the banking.

The qualities essential for a good bookkeeper include quickness and accuracy with figures. Arithmetic furnishes very good training for the prospective bookkeeper. In addition, smooth, legible penmanship is important, for every employer wants his books to be easily read, and also to look well. Nowadays bookkeeping machines are used by some firms. In this case the bookkeeper must be a good typist rather than a good penman, for he types the transactions on cards instead of entering them in books. These cards are then kept on file. If the bookkeeper is employed by a large organization he will be in a "cage" where he does not meet people. In a small organization, however, it may be necessary to meet people, and this calls for tact and a good command of English.

As the bookkeeper's position is quite responsible he is usually paid well, though not extravagantly. As a rule, his pay is somewhat above that of the stenographer, and the head bookkeeper of a large concern holds a very remunerative position.

Such positions, however, are few and are usually held by high school graduates who have studied bookkeeping along with stenography as part of the commercial course.

ADVERTISING

In order to understand what advertising really is, it is necessary to know something of the conditions which have caused it and the purpose it now serves.

When we look back several hundred years we do not find anything that resembles modern advertising. There were no department stores, no enormous manufacturing plants such as we have today, no million dollar corporations, and no great monopolies. Business was carried on in a comparatively small way. Shoemaking, for example, was done in small shops, where one man usually did all the work. Because he could make only a few pairs of shoes a week it was not necessary for him to have many customers. A few neighbors were enough to buy his entire output. Under these conditions advertising was not necessary. The shoemaker's friends, and their friends, came to the shoemaker because they knew him personally. They knew that he made good shoes and sold them at honest prices. The same was true of the tailor, the harnessmaker, and all the other small tradesmen.

But this type of one-man business gradually gave way to other kinds, and there slowly grew up the enormous manufacturing establishments and department stores that we have today. As these huge concerns developed, new methods had to be found for reaching the customer. The friends of the man who owned the business could not possibly consume so large an output as could now be produced. It was necessary to get the goods to other people, who might live hundreds or even thousands of miles from the factory. Accordingly, the business of advertising was to present to the public the products of the manufacturer and the storekeeper in the most skilful and attractive manner and so dispose of large quantities of goods.

The large manufacturer usually has his own advertising department in which he may employ from a few to hundreds of men and women, depending upon the size of the business. The advertising manager and his associates decide what steps must be taken in order to impress in the most favorable way the largest number of people. The usual methods of presenting a product to the public are well known—by newspapers, magazines, bill-boards, posters, street car signs. It is a part of the advertising man's work to select the best methods of bringing this product to the attention of the public.

Along with the advertising departments of manufacturers and retailers there has grown up a new kind of business which does nothing but specialize in the preparation of advertising matter, and which is usually called an "advertising agency." These agencies advise with business concerns who desire their assistance, acting with them as specialists to plan or even write their advertising. The men whom they employ make a study of the article to be advertised, write the advertisement, and rent space in the newspapers, magazines, or trolley-cars, where it is displayed for everyone to read. These special advertising concerns offer the best opportunity for those who desire to learn the business. Here the beginner may get experience both in writing and in placing advertisements of all kinds of goods.

The advertising business offers good opportunities for women as well as for men, especially in the writing and illustrating of advertisements. Every newspaper and magazine employs a number of men whose business it is to visit manufacturing firms and stores and solicit advertisements for their papers. This branch of the work, known as soliciting contracts, will probably appeal to boys who do not care for office work. But in order to become a successful solicitor one should also know something of the principles of advertisement writing. Some magazines employ a great many such agents, under an advertising manager who usually receives a large salary.

The most necessary quality for success in this business is a keen, well-developed power of observation. The boy who would be successful must be bright and wide-awake, quick to see what the public wants and to recognize the quality in his goods that will meet its demands. In addition to this he should have originality of expression. Many an article has been made famous by some clever and timely phrase which has become a by-word all over the country. The main object in advertising is to interest indifferent people. To present an article to the public in the right way, at the right time, in the right place, requires great skill and forethought.

No matter how clever he may be, the boy who cannot write well will never make a successful advertiser. He must have a good foundation in English and know how to present his ideas clearly and forcibly in writing. He must know something of the world of industry and commerce, and above all he must know people. To gain the necessary foundation he should have at least a high school education, after which, if he cannot take a full course in a college or university, he may take a special course in advertising in some evening school.

To the bright and ambitious boy or girl with the necessary qualities and training the field of advertising offers splendid opportunities, and there is no business which is increasing at a greater rate or which has more room at the top for the properly qualified person.

REAL ESTATE

In these days the business of renting and selling and mortgaging of property is so complex, and the laws governing such transactions are so numerous, that the owner of property finds it convenient and necessary to secure the services of a real estate agent, who charges a commission for his work. Frequently such an agent includes in his duties the securing of a tenant and the collection of rents. He must also be familiar with the laws of conveyancing or transfer of property titles by the use of a documentary agreement known as a deed. Sometimes he takes care of drawing up wills, sometimes he places fire insurance.

Usually, as a necessary adjunct to his business he takes the office of notary public, before whom all deeds and all other documents pertaining to real estate must be acknowledged and witnessed.

The opportunities in early days for learning this business were confined to actual service in the office of a real estate agent who was expert in his work. Recently, courses in real estate and conveyancing have been established in various day and evening schools. So it is no longer necessary to spend long years of service to learn this business, and the establishment of trust companies has so facilitated the business of conveyancing that the student may easily start in business for himself.

The hours of labor in this field depend on the energy of the individual and the intensity of his ambition. One person might confine his work within definite hours, and another might work day and night. The work cannot be called sedentary, as much time must be devoted to looking after properties in different places. The pay depends on the value of the man to his employer, and has a wide range. There is probably no other business where the compensation is greater for a man with ability and enterprise who is willing to organize his own business.

Success in this line of work requires a fair amount of education and certain definite qualities of mind and personality. A memory for real estate values and a keen judgment of the factors conditioning them are absolutely necessary; a knowledge of the construction and the materials of a building are also important. A man of pleasing personality will, other things being equal, be more successful than one who is slovenly in his dress and careless in his deportment; above all, honesty and accuracy are necessary for success.

The man who enters the real estate business as a career can be certain of filling a useful place in the community. Not only will he serve individuals in the management of their properties, but he will be of great help to public institutions and public service corporations in fixing the value of land which they desire to use. So the capable real estate worker is assured profitable and satisfying employment.

BANKING AND INSURANCE

BANKING

When you save a part of the money that is given you by your father or mother you put it into a little box called a bank, in order that you may keep it until you want it for something special. When you get older and save a good deal of money you will look for some safer place to keep it, where burglars cannot steal it and where it cannot get lost. In town there are some large buildings, called banks, used just for the purpose of keeping peoples' money for them; and thousands of men, women, and boys are employed in the various operations involved in taking in, caring for, and giving out this money. Perhaps you already have money deposited in a bank and know something about this.

Banks do not keep all the money that is left with them in the bank itself. Men who need money to start a new business, or for some other purpose, will pay for the use of this idle money. In this way the banks are able to meet their own expenses and to pay depositors interest for the use of their money as well. The loaning out (investing) of the money requires a great many transactions, and banking has therefore become one of our largest industries.

There are other advantages in keeping one's money in the bank besides safety and the receiving of interest. If a man wants to send money by mail, or to pay a large sum which he does not wish to handle in cash, he can give a note on his bank, called a check, which the person receiving can cash at any time. All this has to be recorded with great care and accuracy.

If you go into a large bank you will see a sort of cage, and inside this cage, seated behind windows, are the men who receive the money and pay it out to the depositors. These men are called the tellers. Their positions are among the highest in the bank, as they have the actual handling of the money and must be very careful and reliable. A man must have been in the banking business for a long time, and have proven himself trustworthy, before he can become a teller.

In back of the tellers, or in the larger banks in separate rooms, are rows and rows of young men seated at desks, most of whom are working on books. It is the business of these men to keep the accounts, make records of loans and investments, and do all the other clerical work connected with the business of the bank. Their work consists almost entirely of copying and figuring, and some large banks employ as many as two or three hundred men in this department.

If a boy wishes to enter the banking business at the age of fifteen or sixteen he can become a messenger, and if he gives satisfactory service he will probably be given a chance to learn the business. Most banks prefer, however, not to take boys under eighteen, and the boy with a high school education can start with a higher position and advance much more rapidly. Courses in business schools help greatly, and one should have fair training in mathematics and bookkeeping, and be a good penman. A college course is always desirable, but not necessary. Some universities offer courses in banking, and many evening schools, both public and private, offer courses which will be of great help to the boy who has started to work while still young.

Although a good general education is necessary, probably the making of a successful banker lies more in the qualities of the boy himself than in his technical knowledge at the start. There is no business which requires such accuracy and care, such absolute honesty and reliability, as the banking business. Given these qualities, and a fair education, practically any boy with patience to wait his turn for advancement may be reasonably sure of a comfortable income by middle life. On the other hand, the boy who is careless or inaccurate will never make a success of banking, as a single mistake may cause the bank a loss of thousands of dollars, and ruin his career as a banker forever. The work is somewhat tedious and confining, but it has the advantage of shorter hours than those of many business houses.

The position of president of a large bank is one of the highest positions in the business world, and the officers all receive large salaries because of the responsibilities involved. The general policies of the bank are determined largely by them, and the investment of the money is in their hands. It is important, therefore, that they should be men of great business experience and foresight, and of excellent judgment. Practically every boy who starts in a bank can become a teller if he is honest and reliable and is willing to wait long enough, but it takes very unusual ability to be a bank president.

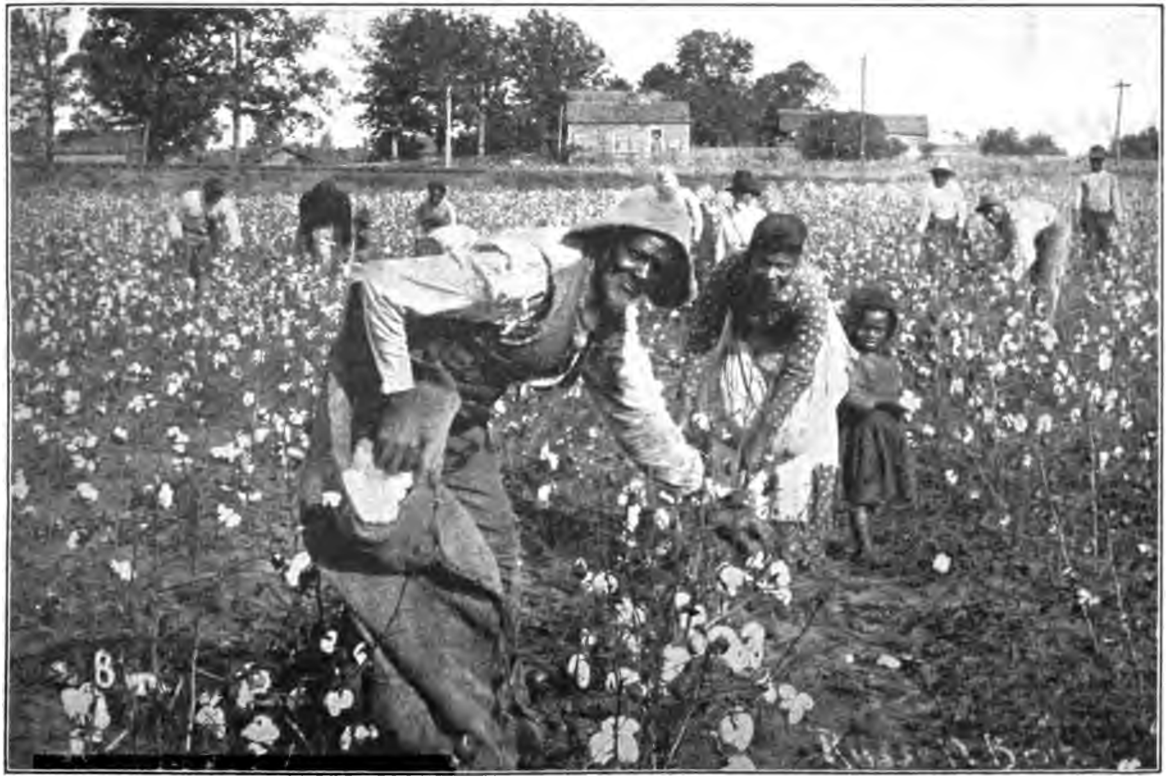
There are many other forms of the banking business for the boy who is interested in the financial problems of the country. The broker or bond salesman acts as agent for people who wish to invest their money in various ways, so as to increase its value. The opportunities in the field of brokerage are much the same as in a regular banking house, except that more judgment and foresight are required for a successful broker than for an ordinary bank clerk.

INSURANCE

Still another form of business which deals with money is the insurance business, which has become very prominent of late. It is based on an arrangement by which a number of men agree to pay a share of the loss by fire, death, or accident which may occur to any one of them. This is done through companies, and each man who wishes to take out insurance against fire or accident pays a certain amount each year into the company. Then if his house burns down or he is injured he receives a large sum back from the company. It is possible for the company to do this on account of the money which it receives from a number of men whose houses never burn or who have no accidents.

The first kind of insurance was that against loss of ships at sea, and there is now insurance against almost everything, from tornadoes to burglary. Workmen's compensation laws in various states require firms which employ men who work at machines to insure their employees against accidents.

The boy with a high school education has a good opportunity to learn the business thoroughly and to rise to a high position if he is ambitious and industrious. All forms of banking and insurance offer splendid training for business in general, and a great many successful men in other fields began their careers in these lines of work.



By Permission of Philadelphia Commercial Museum.

Cotton Picking in Alabama.

III. AGRICULTURAL

FOOD RAISING AND THE CITY BOY OR GIRL

Just as the love of going fishing and hunting, which is so common among boys, comes from the time when men got their food in that way, so the enjoyment and satisfaction in raising food is a strong instinct. Many who are city dwellers are the descendants of farmers only a few generations back, and most people enjoy seeing something grow that they have planted, if it is only in a city back yard.

Each of the food-raising occupations—truck raising, poultry raising, fruit raising, etc.—can be made one's entire business, or can be combined with the others or with other branches of farm work. They may also serve as interesting and healthful side-lines of work for people who are in some occupation that shuts them indoors for most of the day.

But in whatever way they are undertaken they need a thorough preparation. This should include a high school course, with all the physics, chemistry, and biology that is offered. The bulletins of the state and national departments of agriculture should be obtained, as they give much practical advice. If a boy has decided to make food raising his life work he should either attend the regular sessions or take special winter courses in an agricultural college.

In order to test the practical side of the work it would be a good plan to try vacant lot cultivation, or perhaps a vacation job on a farm. The boy or girl who goes into any of these food-raising occupations will have a chance to develop resourcefulness and self-reliance, and will have use for all sorts of ability and training. There is no calling that offers more variety, and none that needs more careful study and attention.

GENERAL FARMING

Agriculture, or farming, is one of the oldest occupations of mankind. It can be justly said that the products of the farm furnish the food for the world. Many volumes have been written upon each of the many branches of farming, so that only a very limited idea of general farming can be stated in a few lines.

By general farming we usually mean the production of the main grain crops and the raising of live stock. Of the grains, the principal ones are wheat, oats, corn, barley, and rye. Of live stock, the principal food-producing animals are cattle, hogs, and sheep.

As the country becomes more thickly settled, and the cities and villages increase in number and population, it takes more food to feed the people and more farms to supply those who wish to farm. As we cannot increase the number of square miles in our country, we can only bring into cultivation less productive lands and make them more productive. The latter is usually accomplished by the gradual division of the larger farms into farms of smaller acreage, thereby giving the crops and live stock better care and attention.

In the Mississippi Valley, where general farming is carried on very extensively, the farmers used to think that the fields would go on forever yielding large crops of corn and oats and wheat, with the same crop on the same field year after year. But they have learned that the soil must have plant food added to it to take the place of the many tons of crops taken from the land each year. On new soil the crops would yield more each year for a few years, and a few backward farmers still feel that the soil is as good as ever. But these farmers are not many in number, and are being supplanted by young farmers who are keen and alive, and who have made a study of farming just as the doctor or the lawyer or the teacher has made a study of his profession. The successful farmer has learned by his own experience and by the experience of others. By testing the soil to ascertain the kinds and amounts of plant foods, and by the results obtained from agricultural experiment farms, he has discovered that the main thing necessary to obtain the best and largest crops from his farm is to keep up its fertility. To do this he must furnish each year the necessary soil food to give the crop all it can eat that is best for its strong and healthy growth. To learn all this has taken years and years of hard, earnest work and experiment, and there is a great deal yet to be learned.

To maintain the fertility of the soil to as high a degree as possible a rotation of crops is the first and greatest essential. By this we mean to raise corn on a field one year, oats on it another year, and clover the next. This we call the three-year rotation. Of course, wheat or rye or barley may be raised in place of the corn or the oats. There is also the four- and the five-year rotation. But this rotation of crops is not all that is necessary, for the plants take up many tons of mineral matter on each field, and we are just learning how to supply this food by the use of limestone, potash, phosphates, and like minerals. Where general farming is carried on extensively it is found that the production of live-stock helps out to a very large extent, that farms well stocked with cattle, hogs, and sheep produce larger crops and crops of better quality than those farms that produce no live stock.

As live stock is so necessary to produce the best crops, so the successful farmer has made a study of the best kinds and breeds of animals to raise, those that will sell for the most money when ready for the market; for farming is a real business, a real man's business. So, in the same manner that he learned about the soil, he learned how to breed cattle and hogs to produce the most and the cheapest meat; how to breed horses that sell for the highest price, sheep to produce the most wool of the highest quality, cows to produce the most milk containing the greatest amount of butter fat. Then the farmer studied how to feed his stock to produce the best bone, muscle, fat, milk, quality, or whatever he desired, in the quickest time and at the least cost.

So it can be seen that the successful farmer has real problems to solve; and he is usually ready and glad to solve them, as everything that he does is full of interest though often accompanied by hard work. However, with the improvement in machinery, and the many comforts that he may now have within his home, his labor is pleasant.

One thing that the successful farmer has learned is that it is necessary for him to have as good an education as is possible. He has learned that the boys and the girls of today who are to be the farmers of tomorrow should have a good common school education, followed by a thorough high school course, and if possible some special training in an agricultural school; but the elementary and high school training is essential for a successful and pleasant life on the farm. For a boy and a girl so equipped there are great opportunities on the farm, and the chances for advancement are as sure and as varied as in any other line of work. There are few sights more pleasing than a well-kept farm, with the buildings surrounded by a lawn, upon and around which grow flowers and shrubs and trees; and in the fields the crops of growing grain, and nearby a meadow knee-high with clover; while in the pastures and around the barn are well-kept horses, cattle, sheep, poultry, and other live stock. General farming is an interesting life, and offers great opportunities to the boy and girl who will take up this line of work.

HORTICULTURE

The word Agriculture brings to our mind a picture of broad fields of waving grain and rustling corn; or row upon row of sturdy plants bearing tomatoes, pumpkins, beans, and other vegetables. Although agriculture suggests to us an occupation of the country, there is one branch of this work, called Horticulture, that is carried on in the city as well as in the country.

Horticulture, which is a special kind of agriculture, teaches us to grow plants, flowers, and vegetables for useful and ornamental purposes. There are four main divisions of horticulture:

1. The growing of fruits.
2. The growing of vegetables.
3. The growing of flowers and decorative plants.
4. The grouping and arranging of plants to increase the beauty of the landscape or scenery. This fourth division is called landscape gardening.

The person engaged in horticultural work is named a horticulturist, though he is usually known by some more familiar term. If he raises flowers or vegetables he is called a gardener. If he cares for trees he is a forester or nurseryman. If he improves the landscape by the skilful arrangement of plants he is known as a landscape gardener.

While much horticultural work must be done in the open country, yet even the city with its miles of asphalted streets and closely built houses requires the services of a horticulturist. The proper protection of trees is understood by the city forester. If his directions were carefully followed our trees would truly be objects of beauty, whether bare or in leaf. How pleasant it would be to take our daily walks in summer on streets offering the grateful shade of spreading, leafy trees, arising from grassy borders along the pavements!

An Eskimo was once traveling in the Temperate Zone. Philadelphia was among the cities he visited. Everything the stranger saw was interesting and marvelous to him. At the end of the day of sight-seeing he spent a long time recounting his impressions. The following is part of what he tried to say:

"Philadelphians are very fond of small worm-like animals called caterpillars. They are found creeping on the sidewalks, the doorsteps, and window-frames. The trees, especially, are thickly inhabited by them. I suppose the people plant trees to provide food for these little creatures. Good appetites they have, for they leave scarcely a tree with its foliage whole and unspoiled. For my part, I much prefer beautiful trees with their fresh green leaves such as I have seen in many other places, rather than these wriggling animals."

Philadelphia, like many other cities, is now trying to exterminate the caterpillars by means of municipal spraying of trees and by educating the people to care for the street trees of the city.

All cities have parks or open "squares" to give the people the necessary breathing places in the midst of closely built-up neighborhoods. The landscape gardener can convert these parks into real places of beauty. With splashing fountains, beds of glowing flowers, velvety lawns, and stately trees, every park could bring health and pleasure to both young and old.

Our public buildings of brick and stone usually appear dull and unattractive. If we gave the horticulturist the opportunity how much he could improve them! Masses of shrubbery might be grouped around the bases, and noble trees could border the pathways leading to their entrances.

Each household, with the advice of a horticulturist, can do its share toward the general improvement of the city. Gardens with fine lawns, porches attractively screened with vines, and windows gay with flower-boxes all assist in attaining the "City Beautiful."

The good work of the horticulturist is not alone for outdoor improvement, but his services are appreciated indoors as well. Beauty in the home adds to the happiness of family life. Plants and flowers bring enjoyment into the household. The florist has ready for us such plants as will live indoors during the winter. He can also supply us with ferns and flowers for our homes.

Horticulture is an inviting field of labor for both young men and young women. There is quite a demand for women on private estates. The "land army," organized during the late war, performed useful and patriotic service during the war. These "war gardeners" and "farmerettes" became so interested in their work that many of them will continue to use the rake and spade in future summers.

Any person selecting horticulture for a career should possess education, good health, and natural ability, as well as a true love for growing things. The necessary training can be obtained at most of the State Colleges.

TRUCKING.

The dirt or earth in which we plant seeds or roots to make them grow is called the "soil." Soils are rocks which have decomposed through the action of the elements. As most rocks are composed of sand, clay, or a mixture of the two, so most soils consist of sand, clay, or a combination of the two. While it is true that any soil may be so treated that it may be made to produce abundant crops, yet the expense of treating a pure sand soil or a pure clay soil may be greater than the value of the crops secured. A heavy clay soil (a soil with more clay than sand) is best for hay and grain farming. A light sandy loam (a soil with more sand than clay) is best for trucking.

Besides sand and clay, soils contain other substances. Every soil contains humus, or decayed vegetable and animal matter. The more humus a soil contains the more moisture is retained in the soil and the better the ventilation of the soil. Plant roots need large amounts of water and air. Hence the trucker adds to his soil large amounts of stable manure, straw, leaves, corn fodder, etc. Soils also contain the three so-called plant foods. These are potash, nitrogen, and phosphoric acid. When these foods are not present in sufficient quantities the trucker buys the needed substance in the form of a commercial fertilizer. To provide a soil with humus or plant foods is an extremely expensive task. Hence, the intelligent farmer purchases a farm with these elements already in the soil. He also purchases the kind of soil which will not readily lose those elements.

Assuming that we have bought or rented our farm, we will proceed to equip it. The amount and type of equipment will depend, of course, on the size and location of the farm. As a rule, however, we shall purchase only the most up-to-date labor-saving machinery. A good tool or machine may save enough human labor to pay for itself in a single day. On a big farm a tractor plow may pay for itself in a single season. On a typical truck farm we shall find many or most of the following machines: tractor plow, sulky plow, walking plow, disc harrow, acme harrow, spring tooth harrow, roller, automatic seed drills, riding, walking, and hand cultivators, hoes, rakes, cart, truck wagon, and motor truck.

After the ground has been plowed and furrowed we may proceed to drill in the seed. Before drilling in the seed, however, the drill should be carefully regulated so that it will drop the seeds at just the correct distances. Insufficient seed means wasting ground, and too much seed involves the labor of thinning out, which is very slow and expensive. Some seeds, such as peas, radishes, lettuce, spinach, celery, and parsley, may be planted while the ground is still cold; but beans, corn, and melon seed will rot if not planted in warm earth. We plant our seeds near the surface in cold, wet soil in order that the seeds may be warmed daily by the sun; in dry, hot weather we plant our seeds deep, in order that they may get the moisture from below. A very rough rule is to plant a seed to a depth of ten times its short diameter. The beginner may plant the novelties illustrated in colors at the front of the seed catalog, but the up-to-date trucker never plants anything but standard varieties. He also tries to plant his seed so that the crop will mature when the market is not plentifully supplied, in order to get the best prices.

When the seed has germinated, or come up, it must be carefully thinned to the proper distance. Weeds must be pulled out to keep them from smothering the crop and eating up plant food. The ground must be constantly loosened up by cultivators or hoes, in order to keep the moisture from below from evaporating and also to let the air circulate around the roots. If we follow carefully all the above suggestions we are sure to get a big crop.

When we market our crops we wash them and pack them in the most attractive way. Small truckers usually retail their produce in market houses or drive around the streets. Other truckers sell their produce to stores at wholesale prices, but the biggest truckers haul their crops to the commission merchants, who charge them ten per cent. for selling.

Many people think that intelligence is not necessary in order to succeed at trucking. This is a great mistake, as more varied scientific knowledge is required here than in almost any other trade. The trucker must be a good judge of soils and know what plant foods are required for particular soils and for particular plants. He must be weatherwise, know the most profitable crops, when to plant them, and how to market them. He must also understand the care of live stock and up-to-date machinery, and know how to keep accurate accounts of his receipts and expenditures.

FRUIT RAISING

An orchardist writes:

Ten years ago I bought a fine, level farm situated on top of a hill overlooking the Schuylkill Valley, in Pennsylvania. The soil base was a sandy loam mixed with gravel. As the ground had not been cultivated for many years, it was covered with a heavy sod. When plowed under, this sod supplied an abundance of "humus"—decayed animal and vegetable matter. The soil contained sufficient potash and phosphoric acid, but was short of nitrogen. To supply the nitrogen five tons of nitrate of soda were mixed with the soil, and clover which had previously been inoculated with nitrogen-absorbing germs was planted. In this way I inoculated my soil, so that by planting clover each August and plowing it under the following May there will always be enough nitrogen in the soil.

Having thoroughly worked up the soil for two years I proceeded to plant an orchard. I learned which varieties of fruits succeeded best in the neighborhood and which brought the best prices. After securing this information through the Department of Agriculture at Washington and the State Department of Agriculture at Harrisburg I purchased some young fruit trees from a nursery. The trees arrived by express about November first, just after the leaves had fallen. As I could not plant them at once I buried all of the bundles in earth. After having plowed and sub-soil plowed the ground I worked it up into rows and cross rows twenty feet apart. In the first row peach trees were planted twenty feet apart. In the next row forty feet apart, and midway between each two peach trees I planted an apple tree, thus making the apple trees also forty feet apart. The orchard was arranged in this manner because peach trees live only about ten or fifteen years, and apple trees do not get their full growth till much later. When the peach trees die the apple trees will gradually fill up the space and I shall have an apple orchard. Trees may be planted at any time that the leaves are off. In planting, most trees are trimmed back to the cane, that is, all side branches are cut away. The tree is then planted in a hole just big enough to hold all the roots.

I have taken good care of my orchard ever since it was planted. The trees have been trimmed and sprayed and the earth has been cultivated under them. During the first spring after the trees were planted I removed all of the young shoots which I did not wish to become permanent branches. Every winter afterward most of the inside branches were trimmed out in order to let the sun into the tree and make the tree spread as much as possible.

Trees have diseases, just as people do. Most of these diseases may be killed by spraying the trees with various kinds of chemicals.

Grape vines should be planted about six feet apart and tied up to heavy stakes. Trim them back to within about six feet from the ground. Some producers plant their grapes on arbors and do not trim them back so closely.

Other small fruits, such as blackberries, raspberries, currants, and gooseberries, are planted from two to four feet apart in rows five to six feet apart. Spraying, trimming, and other cultural directions for small fruits are similar to those for the large fruits before mentioned.

POULTRY RAISING

When we mention poultry we usually think first of chickens, although poultry includes also ducks, geese, turkeys, and guinea fowl. Each of these kinds of poultry has its varieties, its own particular history, and requires its own special care. In this account we shall confine our attention to chickens.

There are nearly as many kinds of chickens as there are nations. Thus, we have the heavy Asiatic chickens, including Brahmas, Cochins, and Longshans. In the American class we have the Plymouth Rocks, Wyandottes, Dominiques, Jersey Giants, and Rhode Island Reds. In the Mediterranean class we have the small nervous types, such as Leghorns, Minorcas, Andalusians, and Black Spanish.

The Asiatics are the heaviest, and hence the best table bird. They are, however, poor layers and are not good food-getters. On the other hand, the Mediterranean breeds are very small and hence poor birds for the table, but are good layers and good foragers or food-getters. The American birds are fairly heavy, fair layers, fair foragers, and especially good setters. If one wants merely big table birds the Asiatic breed is the breed to raise; if one wants eggs at least cost the Mediterranean birds should be selected, but for general purposes the American breeds are best.

In olden times it was customary for the hen to hatch her own chicks, as the wild fowl still do. The thrifty housewife would mark from twelve to fifteen fresh eggs and put them under a hen that persisted in sitting on her nest. After twenty-one days the young chicks broke their shells and came out. Then the old hen was put with her chicks into a coop, where she lived with them for about two months. The invention of the incubator and brooder, however, has saved most of this time for the hen. The incubator is a box standing on four legs, which can be kept constantly at a temperature of 102 degrees. This box is partly filled with eggs, and after twenty-one days more little chicks are hatched than by the hen. These little chicks are then put into another box or room which is kept at a somewhat lower temperature, but still high enough to keep them warm. In this way they are brought up without the need of a hen.

Chickens which are hatched in March may begin to lay in November or December. Those hatched in May will not lay before February or March. Hence, pullets hatched in March are most profitable, because they lay eggs when eggs are highest. Old hens lay few eggs from September first to February first.

An up-to-date poultry plant contains a warm incubator house, a brooder house, and houses for older chickens. In many cases these houses for older chickens are distributed through the fields, so that the chickens may forage for food. They are built to accommodate from thirty to one hundred chickens and contain roosts and nests for them. They are warmly built and have at least one window facing the sun. The house should be cleaned daily and whitewashed and disinfected monthly. The floor is usually littered with chaff or straw, in order that the hens will have to work for their food which is concealed by the litter.

In summer, if left to range at will, chickens will find bugs, worms, greens, and seeds enough to satisfy all needs. In winter, however, these elements must be supplied if we are to expect eggs. A mixed diet containing grit, grains, meat, bone, and greens is best for egg getting. Too much food is worse than not enough, for if overfed, chickens are apt to become too fat and lazy to lay. Corn is a splendid food for fattening chickens for market and for keeping them warm, but as it contains little albumen it is not favorable to egg production.

DAIRYING

History.—While the importance of milk as a food is fully recognized by people in nearly every country, and milk and its products have been used as far back as history records, the general use of this food has come about only with the development of highly civilized nations. The native races of America, Africa, and Australia, which have never developed past the stage of barbarism, do not use milk as food. In early times, in small communities, each family kept a cow, or a small dealer would own a few cattle and supply his neighbors with milk. With the development of the science of agriculture and the improved means of transportation it has become possible to produce milk on a large scale on the farm and convey it to the consumer in the city in a wholesome condition. The industry which produces milk and its products in this way is called dairying.

Distribution.—There are no cattle native to America. All those found here are descended from animals brought from Europe. About one-third of the cattle in this country are raised chiefly for milk, the production of which is largest near the great centres of population. New York, Wisconsin, and Iowa have the largest dairy interests. Minnesota, Illinois, Texas, and Pennsylvania also carry on considerable dairy business. Dairy farms are favorably situated in the corn belt and where hay, oats, and other feeds grow in abundance. In 1910 the United States had one cow for every four people and made about twenty pounds of butter, five pounds of cheese, and six pounds of condensed milk for every person in the country.

Breed.—The best dairymen today make a careful selection of their cattle. Since cows vary in the quality and amount of milk which they yield, one important consideration is the breed. Among the most profitable breeds is the Holstein, a black and white cow, native of Holland. This cow is noted for the large quantity of milk which it yields. The Jersey cow is native of one of the islands of the English Channel. It is one of the smallest of the well-known breeds and is tan colored with white patches. The Jersey cow yields milk very rich in butter fats. The Ayrshire is a native of Scotland. It is a medium-sized cow, well adapted to grazing on broken and rugged pastures. The prevailing color is red and white, spotted in appearance, and sometimes called brindle by the dairyman. The Ayrshire is also a large milker. Other well-known breeds of dairy cattle are the Guernsey, yellow and orange in color, and the Devon, a red cow. Many dairymen do not give the matter of selection of cattle the attention which it should have, and the quality of milk is not so good, as is noticed by the size of the cream collar in the milk bottle when it reaches the home of the consumer. A quart of milk from one cow may be worth twice as much as the same quantity from another.

Care of the Cattle.—Perhaps the most important building on the dairy farm is the stable. It should be constructed with a view to the health and safety of the cattle, and to the convenience of those who must care for them. There must be sufficient light and ventilation. Sanitary arrangements provide for the cleanliness and comfort of the cows. Cement or planked floors are cleaned frequently and powdered with lime or other disinfectant. Bedding is changed daily. Walls are whitewashed and free from dust or other foreign bodies. Doors and windows are screened. Single stalls are provided, that the cattle may not molest each other; and each cow has an individual drinking fountain and feed trough, thus preventing the spread of disease.

While some feeding is done in the pasture, much of the food is supplied in the stable. Prepared grains, fodder, hay, and ensilage are the principal foods. Soon after the cows are on pasture, usually in the latter part of May, they reach the maximum production of milk for the year. The farmer learns from this that he must try to supply food like that of early summer throughout the year. Hence, he builds a storehouse for green foods. Green corn, alfalfa, cow peas, and other plants are shredded and stored in an air-tight storehouse called a silo. This ensilage is fed throughout the year, together with grain, making a wholesome and well-balanced diet. The United States Government has made extensive experiments on various mixtures of ensilage. The dairyman may have, for the asking, bulletins telling him how to get the best results from the foods available on his farm. Dairy testing associations have been organized throughout the United States, helping the dairyman to determine the exact output of each cow in his dairy. By careful testing and record keeping the owner can learn which feed will produce the greatest amount of butter fat, and what profit the cow is returning on the investment.

Milking.—Milking is done in the morning and in the evening, as a rule, with twelve-hour intervals. However, some cows, known as heavy milkers, are milked three times daily. The day has long gone by when any member of the household or one of the farm hands milks the cow without any special preparation. The milker must be cleanly in his habits, and should be intelligent enough to understand and practice care in performing this important operation. The cow should not only be kept clean, but should always be treated kindly. She should be groomed before milking, so that no particles of dirt or other matter fall into the milk pail. In fact, milking the cow has come to resemble a surgical operation so far as antiseptic methods are concerned. It can be well done only through cleanliness and attention to minute details and an intelligent understanding of the problem. Some dairymen require their workmen to wash and dry their hands carefully and put on a clean laundered uniform before milking. A machine has been invented to do the milking, and has the advantage of preventing possible infection from the hands and person of the milker.

Care of Milk.—Milk must be cooled immediately after milking and kept cool until used by the consumer. This prevents the growth of bacteria and the souring of the milk. A device known as a cooler is placed in the milk house adjoining the stable. The milk is poured into the cooler, which is kept at a low temperature by a stream of cold water passing constantly through the machine. It is then drawn off into cans and stored in a cool place until it is shipped either to a creamery or to the milkman for distribution to the homes of those who will use it.

Certified Milk.—Certified milk is the name given to milk produced under careful conditions. It is milk of uniform composition and of highest quality, obtained by cleanly methods from healthy cows, under special sanitary precautions set down by a milk commission. In other words, it is the very best, the very cleanest, the very purest, and the very safest raw milk it is possible to produce. Naturally this milk sells at the highest price, since it costs much more to produce it. In the absence of certified milk, many cities require the milk to be made free from disease-carrying bacteria. This is done by subjecting it to a treatment known as pasteurization, named from the distinguished French chemist, Pasteur. The milk is heated to a temperature of 145° F. for thirty minutes and then cooled for transportation. The best scientific authorities claim this process destroys most of the disease-carrying germs in the milk, but it will not prevent it from turning sour. When milk is pasteurized at the correct temperature and time it keeps about twenty-four hours longer than it otherwise would.

Infection.—Most diseases of man are contracted from man. Human contact with milk is therefore one of the main things to be avoided. A few of the harmful germs in milk come from the cow, such as tuberculosis, but most of them come from the persons who handle the milk. They are mainly typhoid fever, scarlet fever, diphtheria, and sore throat. Cows should be tested frequently for tuberculosis, and those infected removed from the dairy or killed. As has been indicated in dealing with the milker, no person suffering from any disease should be permitted to work in the dairy or handle the milk in any way. The same precautions required at the dairy in handling milk should be exercised by the milkman in its distribution, by using sterilized milk bottles for delivery. Likewise, in the home everything should be done to prevent contamination before it is served at the table.

Milk Products.—Among the principal foods made from milk are butter, cheese, condensed milk, evaporated milk, and milk powder. Other products resulting from the manufacture of these foods are buttermilk, skimmed milk, and cottage cheese. These products may be made at the dairy farm or they may be manufactured on a large scale in a central plant called a creamery. Cheese is usually made in a separate factory. Small dairymen in isolated sections of the country find it more profitable to sell their milk at the creamery than to manufacture the milk products at the dairy farm.

Education.—The whole country is beginning to recognize the great advancement in agriculture, and this is especially true of dairying. The methods employed by the old-time dairyman have been too slipshod, and his training and preparation for the work have been lacking in many ways. In the past it was believed that anyone could engage in farming or dairying, but now it is recognized that to be successful one must have a scientific training for this work. The application of the principles of physics, chemistry, biology, and other branches of natural science to dairying is of very recent origin.

The chief requisites in scientific dairying are the analysis of the soil to determine the crops and fertilizers best adapted to it, the selection and testing of the seed to secure the greatest yield, the study of plant diseases and insects, and the application of the principles of animal industry. While the former pertain more particularly to agriculture in general, the latter relate especially to the breeding, care, and feeding of dairy cattle.

The dairyman must know how to make a careful selection of his herd. He must be able to determine the right sort of pasturage, and provide the right kind of feed in addition to pasturage. Likewise, he must have a knowledge of the construction and maintenance of suitable stables and other buildings necessary to the work. He must also know how to keep a set of books and records that he may know at any time how he stands financially. He must be a good business man.

The demand for trained dairymen is greater than the present supply. The student who expects to engage in this industry should take a course in animal husbandry in an agricultural college. These colleges are found in nearly every state in the Union, and in many of them the courses are free to residents of the state. Many of the agricultural colleges require a high school education or its equivalent; some will admit students with a grammar school preparation, but these are usually permitted to take only partial courses and are not given the college diploma. In many of our rural schools elementary courses in agriculture and dairying are provided, and these lead up to more advanced work in high school and finally prepare the student to specialize in college.

The dairy business offers good opportunities for those who like country life and are fond of animals. Many city boys like to go to the country and spend their vacation on the dairy farm. This is a good beginning if they are thinking about taking up the work later. Driving home the cows, watching them while they are being fed and milked, and becoming familiar with the life of the dairyman may awaken interest in this occupation.

IV. PUBLIC SERVICE
AND
PUBLIC SERVICE COMPANIES

OUR POLICEMAN

"OH! Mother," cried Johnny as he entered the door one afternoon on his return from school, "our policeman is away and I am on the committee to find out why he is absent. I am on our school Safety Patrol, too—we have to guide the small children across the streets. You know we have a great amount of work to do, for our policeman was always kept busy directing the traffic and taking the boys and girls across the streets. The members of this Safety Patrol are to wear green arm-bands on which the letters S and P are placed in white. I am going to the station house to ask the lieutenant what is the trouble with our policeman."

The next day Johnny came home and told his mother the following story:

"Well, son, what do you want?" said a jolly looking police officer as Johnny entered the station house. Johnny told him that their policeman was away and that he and his school friends wished to know what the trouble was.

The patrolman sent Johnny to the house sergeant, who was a big, goodhearted man. This house sergeant told him that the officer was very sick, but that the committee could visit him as soon as he was better.

"While we were at the station house the lieutenant came in with another tall man. The house sergeant told these two men what we are doing in our school.

"What do you suppose these men did then? The tall one was the captain, and he took us through the station house and showed us the four dormitories with ten snow-white beds in each, the gymnasium, the bowling and pool rooms, the rest rooms, the prisoners' cells, the small private offices for the sergeant and the lieutenant, and everything there was to see. The gymnasium had more apparatus in it than ours, and you know how many things we have.

"The captain told us how as a young man he had taken the examination in order to get on the police force. He said that although many young men would have liked to pass the examination, only a few did, for the examiners asked them questions not only about the city but also in mathematics, spelling, and geography. They even considered the penmanship.

"The captain passed this test and obtained a position as a patrolman. As a patrolman he had to go to a police school for six weeks. He told us about the school. It was held on the third floor of one of the station houses and had several large rooms in which to hold classes. In one of these rooms there were large desks and chairs and one other room was used as a gymnasium.

"The captain told us of the wonderful things they were taught, such as how to overpower, by means of a twist of the arm, prisoners who attempted to resist and cause the officers trouble. Such a funny name they give to this—'jiu jitsu'! They also learned the rules and regulations required by the city laws, and how to make daily reports. They were taught gymnastics which were to help develop their bodies physically. While in this school he was given a Police Manual which contains all the rules an officer must obey.

"And, Mother, this captain told me that during the years while he was a patrolman he met numbers of people who became his friends. No doubt he had a few enemies, and he had to work hard.

"He did not have to go to work at the same time day in and day out. One week he went to work at eight o'clock in the morning and was on his beat till four o'clock in the afternoon. The next week he went at midnight and worked till eight in the morning. The third week he made his daily rounds from four P. M. to twelve at night. Of course, when emergencies like strikes occurred, he had much longer hours and had very little time to spend with his family. Every third week each patrolman had a long day off and he had two weeks' vacation in the summer time with pay.

"The patrolman then took the examination for sergeant. While he was sergeant he always treated his men kindly and was careful to make daily reports. By and by he became a lieutenant.

"While he was patrolman his salary was low, as he only received two dollars and fifty cents a day, but each time he was promoted there was an increase in his pay. Of course, a patrolman at the present time receives more money than this captain had received.

"Now he is a captain, and there is only one more position he desires and that is to become superintendent. As a captain, he intends to perform all the duties that are before him and to do his very best by his men.

"Oh, yes, he told me about the pension fund to which every man belongs and to which he donates one day's pay each month. When an officer has been on the police force for twenty years he is able to retire with a salary per month equal to one-half the full month's pay.

"Oh, mother, it was wonderful to listen to the captain. He certainly is a good man. I intend to take the examination when I am old enough and become a 'cop,' and advance as this captain has done."

You have read what Johnny and his committee learned about the policeman and his job. Every boy and girl knows much of what an officer has to do while on duty, many of the hardships as well as the pleasures of service. Perhaps your policeman will tell you more about this occupation if you ask him.

FIRE FIGHTING AND FIRE PREVENTION

"Ding, dong, ding, dong!" A sudden harsh racket, the swift revolution of hurrying wheels, the shouts of excited spectators. Soon they come into sight—first the chief's flashing red car, with a uniformed fireman at the wheel, his face grim and set, indiffer-

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Fighting a Fire in Winter.

ent to the excitement his swift advent creates, conscious only of the song of his engine as his foot presses open the throttle. Then the fire engine—a harmonious picture of brilliant paint and flashing brass.

The fire bells bring a thrill to every hearer, young and old. How many times have you rushed headlong after the vanishing engine, the sound of its bell a siren call you had neither the inclination nor the will to resist. And how many times have you stood at a safe distance and watched the cruel progress of the licking flames. How often have you watched the firemen disappear behind the curtains of smoke, and reappear with some pitiful human burden their courage has saved from the flames. How often have you been fascinated by the play of the long hose on a burning roof, and listened entranced to the roar and crackle of the rebellious flames. And then, when it was all over, and what was once a fine house or a flourishing store stood a black and smoldering ruin, you have turned away with a half-ashamed feeling of disappointment that the fun was all over.

But have you ever stopped to think of the dreadful meaning back of all the brilliant display and the breath-taking excitement? Have you ever thought of the loss in money and the horrible risk of human life? One house may mean a whole row—one row a whole neighborhood. Think of the horror of a slow, torturing death by fire. Think of the days and nights of sleepless agony that a burn may mean. Think of the risk that a fire forces on the brave men who have taken it on themselves to save, where they can; to limit the area of destruction, where the flames are too strong for them.

All this escapes the average unthinking citizen, but the fact that it has been thought of is proved by the presence in our cities of groups of men whose special duty it is not to fight a fire after it has started, but to prevent the possibility of its starting. These men wear no uniform, their praises are unsung, their very existence is unknown to thousands whose homes they are endeavoring to safeguard, but their work is invaluable.

The duty of these men, who are usually under the command of a Fire Marshal, is to cut down as far as possible the fire hazard in the city. To this end the Fire Marshal has under his direction a small number of trained men whose duty it is to inspect all buildings where the fire hazard is greatest, such as manufacturing houses where highly combustible articles are made or used, or houses of storage for explosives and high-powered chemicals. This part of the work requires, besides ordinary intelligence, a good working knowledge of these chemicals and explosives. This is the only specialized knowledge required by the fire prevention force. It is knowledge that any boy obtains by steady application to the course of study given him in the science department of any city high school.

Besides this special inspection, however, there is the ordinary routine inspection of all houses, stores, places of amusement, apartment houses, etc., which must go on ceaselessly. This inspection is carried on with a view to learning of any conditions which might cause fire, or the violation of any regulation, ordinance, or Act of Assembly governing the safeguarding of buildings against the possibility of fire. For instance, a certain ordinance in one large city demands that all apartment houses have easily accessible fire-escapes; that no person be permitted to store gasoline or other explosive material in his home; that motion picture houses must have fire-proof boxes for the housing of picture machines; that all theaters or other public gathering places must have a regulation number of emergency exits, depending on the size of the hall and the arrangement of the seats. It is the business of the inspector to see that these regulations are complied with.

The inspection also covers the examination of all apparatus established in the buildings—*e. g.*, stand pipes, sprinklers, water buckets, fire extinguishers, fire doors, trap-doors, elevator shafts, and stair wells—with a view to ascertaining whether or not the apparatus is in good working condition, and whether or not the openings to elevators, trap-doors, etc., are properly protected.

This work is humdrum and inglorious enough, beside the spectacular glories of the firemen's life. But in both cases the work is hard and taxing, and often fraught with very real dangers. This dangerous element is more apparent in the life of the fireman. He lives, during his working hours, in a two storied brick or stone building. The first floor is usually given up to the fire-fighting apparatus, and to the wonderfully trained horses, where motor trucks are not in use.

The upper floor is divided up into the rooms where the firemen sleep, and the office of the foreman or captain in charge of the company.

The next time you hear those magic fire bells, follow them back to their home, and pay the firemen a little visit. They will be glad to show you through their home. And when you go, don't forget to have the fire engine shown you. It has a wonderful collection of extra parts stowed away inside of it, to be used whenever the need arises.

The fire-fighters have long hours on duty (usually a twelve-hour shift) and see but little of their families. This is unfortunate, but the life of a fireman is a thrilling one, and no public servant is more useful. Most cities and towns are trying to arrange an eight-hour working day for the firemen. Perhaps your firemen already enjoy this arrangement.

While on duty, and when not rushing in swift answer to the fire-alarm which hangs in every fire-house, the men polish and clean their apparatus, attend to the horses if there are any, and keep the fire-house generally neat and tidy. In some cities they may attend a firemen's school, which instructs them in methods of fire-fighting and makes promotion possible. Usually some of the men are doing inspection work in their district. So that their life is a busy as well as a thrilling one.

A high grade of intelligence, supplemented by at least a good public school education, is needed for a work of such importance as that of fire-fighting and fire prevention, where the demands made upon the men are so constant and so exacting.

TELEPHONE OPERATING

Most of us today accept the telephone as a matter of course. We use it as naturally as we use pen and ink for writing or a knife for cutting our food, yet the telephone is not fifty years old. Benjamin Franklin had to depend on the slow stage coach to take his letter to Boston and it took two weeks for him to get an answer from Baltimore. Daniel Webster never saw a telephone, yet today the forces of nature are so at our command that we can communicate with a person at the other end of the country in a fraction of a second. The telephone, by making the message and the answer almost instantaneous, has brought all fellow-citizens into close touch with one another. There is no institution or corporation, no store or office in the entire country, that can do business effectively twenty-four hours without it. There are more telephone messages sent today than the total number of letters and telegrams sent, added to the number of railroad tickets sold.

Telephone operators have become very numerous. There are nearly 125,000 young women in the United States that are earning their living in this comparatively new occupation. Out of every fifty girls of twenty or twenty-one years of age one is a professional telephone operator. Telephone operators are trained in schools conducted by the telephone companies. The telephone school is unique in the fact that it charges no fees, pays the girl while she is learning, and then provides her with a job when she graduates. For the position of telephone operator an applicant between the ages of seventeen and twenty-five years, who has not been previously employed, is preferred. She must have good health to endure the nervous strain and be able to see and hear well. She must be able to speak distinctly without any foreign accent. If a girl is less than five feet two inches in height she usually has not the stretch of arms to enable her to reach all the numbers on the switchboard. She should have an elementary school education. The work of telephony requires girls who are well poised, gracious, and alert. The normal young American woman who is earnest, reliable, self-respecting, and of good character and reputation will be successful in the telephone business. A quiet voice, deft fingers, patience, courtesy, and attentiveness —these are the qualities which the telephone company requires in its employees.

The operator controls the delicate apparatus which makes telephone speech possible. She dispatches the messages over the proper wires. The operator works in pleasant, congenial surroundings. The Central Office is large, cheerful, and well ventilated, and is kept scrupulously clean. The work itself is clean. It does not call for any great physical exertion, but it requires the utmost care. The operator's fingers must be well trained and her mind alert, because her errors are trying to the patience of telephone users. She works eight hours a day, except that when her tour of duty extends into the evening hours she works one hour less per day and is given extra pay. She is on duty six days a week.

The telephone office is essentially a woman's sphere. Boys as operators proved consistent failures. From first to last the chief operator deals with women. Above the operator in the company's organization is the supervisor and over the supervisor is the chief operator, always a woman. The women who have charge over the operators are selected with great care. They all come up from the ranks of operators, and not only are they proficient in handling telephone apparatus but they understand the girl and her problems, and they deal sympathetically with her. For each group of eight operators there is a supervisor, whose duty it is to guide and advise the operator in her work and assist her if she suddenly has an unusual stress of calls. For the girl who has the personality and ability to direct the work of others there are opportunities to advance to the positions of supervisor and chief operator, for which the salaries compare favorably with those for women in any industrial line.

After a few weeks of training the beginner is transferred to a Central Office, and then for the first time begins to handle real calls at a real switchboard. While her salary is not as high as that paid in commercial occupations requiring technical preparation, such as stenography, it advances as her proficiency increases. Advancement to the positions of supervisor, assistant chief operator, evening chief operator, and chief operator are made on the basis of education and proven ability. The telephone companies have found that it pays to keep the girls in their employ, and accordingly they make special payments for long service.

Among all who attend to our general needs few are more important than the telephone operator. With the aid of the organization of wires and workers, of which she is a part, she makes work easier and life happier for us all. The operator has shown her devotion to duty in countless crises. Time and again she has stayed at her post until fire or flood came to the doors of the building in which she worked, and has given the alarm which has saved hundreds of lives. When the emergency calls come for help—"Quick, the hospital!"—"The Fire Department!"—"Police!"—she is trained to save half-seconds. It is then the user appreciates the insurance value of a capable and attentive operator. The great public respects her because of her unfailing devotion to its interests, and because she has accepted responsibility in a way that has made American telephone service the envy of the world.

Automatic telephones are gradually being installed in most large cities. These may eliminate the necessity for additional operators for some time, but there will always be need for a certain number of very intelligent operators to supervise the automatic machines.

TELEGRAPHY

The idea of using electricity as a means of conducting sound is quite old, and many experiments were made in this field in the eighteenth century without any positive success. But in 1837 Dr. Samuel Morse, an American, invented the telegraph system as we now know it. Of course, since then great improvements in equipment and inventions in multiplex message systems have been perfected, but Morse's ideas are still the basic principle of telegraphy. So rapidly has the field of electric telegraphy expanded that now it includes not only private telegraph companies for transmission of messages and railroad operation but also police alarm systems, stock quotation tickers, ocean cables, and long-distance typewriting. The present day tendency toward complex business organization, which discounts delay and distance as much as possible, brings increasing demands on the telegraph. We can safely say that telegraphy is still in its childhood. It is a business bound to expand—an essential of all modern life. This means that boys and girls may look toward telegraphy as not only an interesting but also a permanent vocation.

Why is the telegraph business so interesting? Probably one great reason is the variety of occupations which it offers. When people say "telegraphy" do you always think of the operator tapping away on his key or listening intently to mysterious long and short sounds and then transcribing them into words? It is true that the operators do form the majority among telegraphers, but there are many other kinds of workmen necessary to the business. Wires must be made and set up over long stretches of territory, poles must be erected, stations must be constructed; and all this equipment must be kept in repair. In addition, a large amount of inside equipment must be bought and kept in condition. Business must be solicited, customers gained, and charges made. Accounts must be kept with great care, as in other big businesses, legal matters must be attended to; complaints and claims must be adjusted, and the company must be financed. Supplies must be purchased, and insurance and other relief and co-operative plans must be organized for employees. For these various fields of work special departments have been organized.

The largest and most important department is, of course, the operating department. Here we find not only the Morse telegrapher, transmitting, relaying, and receiving messages, but also the multiplex operator, the telephone operator, and the office messenger. These do not come in direct contact with the public, but they perform the actual labor of sending telegrams.

Let us consider the Morse operator. He must be familiar with the Morse alphabet or code, so familiar with it that he can translate instantaneously from sound to word and from word to sound. This necessitates a high degree of sense training, a co-ordination of touch and hearing, and an agility of mind gained only through careful training and intense concentration. Accuracy and speed are necessary for a first class operator, and one must not be sacrificed for the other. No telegraph company can afford to employ an operator who will let a questionable letter or word go through unchallenged. An error of one letter in a code order may mean the loss of thousands of dollars to the patron receiving or sending the message. Speed is also such a big factor that every operator in the large telegraph companies must be an expert touch typist, so that as he hears the sound and translates it into letters he can at the same time hit the proper typewriting key without taking his attention away from the sound for one moment.

The expert Morse telegrapher must be a good speller with a good general education and the power of concentrated attention. Besides this he must have had special training both in the code and in typewriting.

How can a boy or girl receive this preliminary training? Most of the large offices of the telegraph companies conduct schools of their own, where they train young employees who are performing some other branch of service. Thus a young, ambitious boy or girl of sixteen may enter the service as a minor clerical employee and receive regular instruction at the company's expense until he or she graduates as a junior operator. This is an excellent means of learning the business from the "bottom," and many of the present officials have worked their way up from such minor positions.

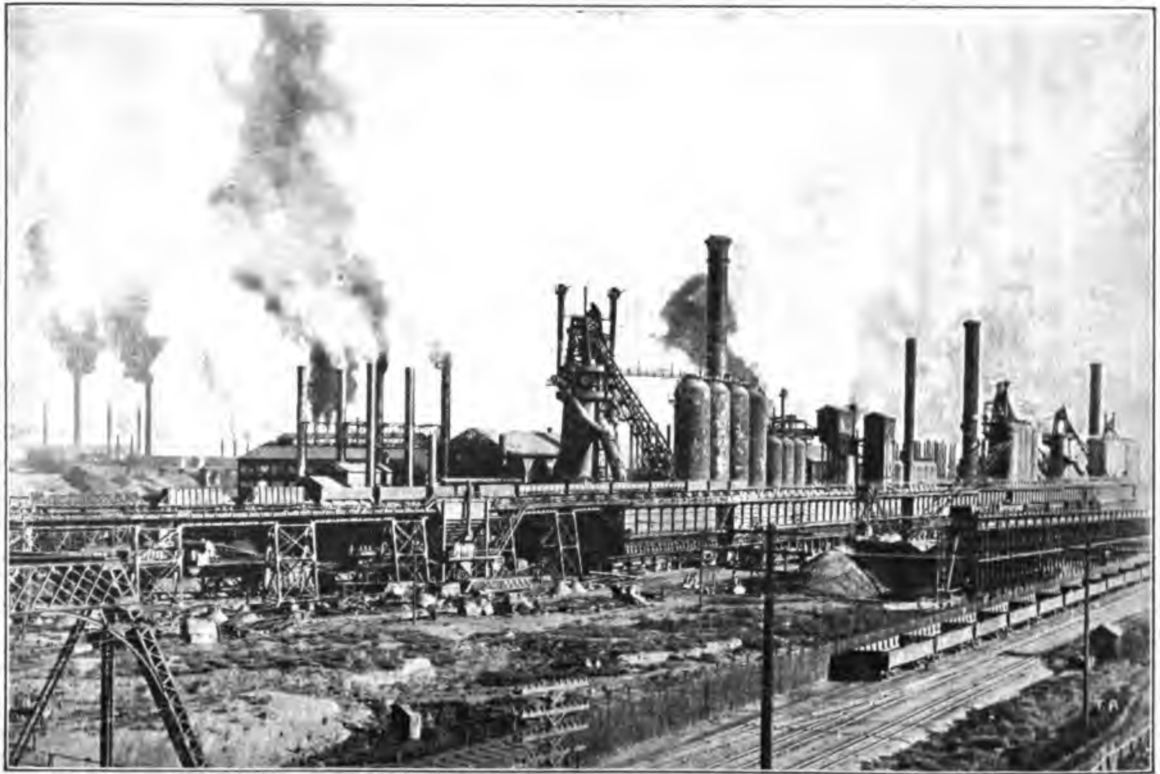
Applicants for any position are obliged to pass a rigid physical and educational test. Since the telegraph company, like many other business organizations today, carries, without cost to the employee, both sick benefits and life insurance for every person in its employ, it can afford to employ no physical defectives. It also maintains a high degree of efficiency through its educational requirements. For any position the applicant must pass tests which require at least a grammar school education.

The Morse operator has the necessary bases for most positions with a telegraph company. One of the most interesting departments is known as the "Testing and Regulating Department." Here we find men who possess, besides a knowledge of telegraphy, an understanding of practical electricity. These employees test wires for breaks, and keep in touch with the linemen who do the actual repair on outside wires. These men may be general "plant" men, with a scientific knowledge of all the electrical machinery found in a telegraph office. They are the highest paid of the actual manual workers among the employees.

The so-called "line" men work in squads, much as do the repair men of a railroad. They gain valuable experience which can often be made use of in other electrical work. It was the men who could set up or "string" a wire, as they say, and keep it in repair who did such notably useful work in the World War.

Other phases of the work of telegraphy are done by a large body of clerks and statisticians, as well as by highly trained specialists and successful business men in the larger official positions.

A boy before entering this field of work should consider well whether he is fitted for it. If he can stand the nervous strain of operating he will find it steady, remunerative work, with slow but sure advancement and big possibilities of finding his way into some broader phase of the work. Efficiency is usually recognized by the company by giving further training and by promotion into other departments. Moreover, many interesting fields outside the large telegraph companies offer attractive



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Railroad Siding at a Fuel and Iron Plant.

positions, such as railroad operating, private brokers' wires, and cable and radio operating. A high school education helps an operator to secure these and many more desirable positions.

RAILROADING

What boy has not at some time or other wished to be an engineer on a fast express train, or even a brakeman or signalman, guiding the many trains from the signal tower? There is a certain fascination about the railroad for all of us.

Less than a century ago if our ancestors wanted to go from Philadelphia to New York they had to take a long tiresome trip by stage coach, traveling all day and spending at least one night on the way. Today one can make the trip in the morning and return in the evening, and have a full day to spend in the city besides. Then the journey to the western coast, made on horseback or in large heavy wagons which could go through vast unsettled tracts, was attended with great hardships, occupied months of time, and was the event of a lifetime. Today, on the railroad, it can be made within a week without serious discomfort. Every year thousands of people travel to California and back just for health or pleasure, and for the sake of the wonderful scenery that may be enjoyed on the way.

Railways originated in the tramways which were built in England, as early as the sixteenth century, for the purpose of hauling coal from the mines. The steam engine was not invented until nearly two hundred years after this, however, and was not perfected as a means of locomotion until the early part of the nineteenth century. Later the principles of electricity were applied to the railroad; and we now have not only an elaborate system of trolleys, both surface and subway, in all of our large cities, but also thousands of miles of electrical railways, over which trains run at as high speed as those propelled by steam.

The work of carrying passengers and freight furnishes employment to over two million people in the United States, and it is an occupation which affects us in many different ways. The prices of food and clothing, the cost and comfort of travel, the speed of our mail service, convenience in our business relations, are all dependent upon railroad facilities.

The railroad business is divided into two distinct and widely separate branches—the operating department and the business department. Supervising the work of both of these and directing the general management of all policies are a number of officials, managers, and superintendents, and a board of directors with its officers.

The operating department is responsible for the running of trains and all that pertains to the mechanical side of the road. The business department looks after the money, fixes the rates, sells the tickets, does the clerical work, and attends to all the business part of the railroad.

The operating department has many divisions, and there are so many different occupations included in it that it is impossible to describe them all. There are engineers and mechanics of all kinds, machinists and other shop men, enginemen and firemen, trackmen, conductors and brakemen, switch- and crossing-tenders, and watchmen.

A boy can enter some branch of the railroad business at almost any time after he has completed his grammar school course, and if he is of a mechanical turn of mind he will have plenty of opportunities to advance himself. His chances will be much better, however, if he has a technical education of some kind. Manual training courses in the high schools or courses in mechanical drawing at a trades school are a good foundation for railroad work. Of course the best preparation of all is a regular college course in mechanical engineering, which may be obtained at any of the leading universities of the country.

There is no line of work which offers better chances of advancement, and in which promotion follows more surely to the deserving boy, than railroading. In most branches of the work the pay to begin with is not high, and advancement is usually not rapid, but it is steady and sure, and there is every opportunity for the boy of ability to make good. Practically all railroad men who hold high positions have begun at the bottom and worked their way up, though many of them began with technical and even university training. Andrew Carnegie received much of his early training in the service of the Pennsylvania Railroad, where he was in turn telegraph operator, mechanic, and official, until he finally left it to go into business.

Railroading, probably more than any other business, requires a specific knowledge and experience obtained in the work itself; and it is almost impossible for a business man, however successful in other lines, to come in from the outside and adapt himself to railroad conditions at once.

The clerical side of railroading needs much the same preparation as any other clerical work, but even in this by far the best opportunities are open to the boy who has some technical knowledge as well. The highest positions—those of superintendents and managers of the various branches—are filled by men with a broad knowledge of both the mechanical and the business side of railroading.

Of late years a new form of railroading has come rapidly to the front, that is, the trolley or electric road. For some time after trolleys took the place of our old-fashioned horse-cars they were used only in cities, but within the last fifteen years trolley lines have been built from city to city, running through woods and farms and opening up many new country districts.

The trolley or street railroad offers much the same opportunities as the steam railroad, although the chances for a boy without special training are less. The boy who has only gone through the grammar school is not often qualified for a position higher than that of motorman or conductor, and these do not pay as well as corresponding positions in the steam railroad service. There are excellent chances in the power houses and repair shops, however, for the boy who knows something of mechanics or has received a technical education in electricity.

GAS AND ELECTRIC COMPANIES

Most of us living in the more closely populated districts now enjoy the use of two great conveniences, gas and electricity, for lighting our houses and cooking our food. Gas and electric companies supply our homes with these two things now considered necessary in our modern civilization. The city or town in which we live sells to these companies the right, or "franchise," to sell gas or electricity, sometimes both, to all the people within a certain district. The companies agree to furnish gas of a certain fixed standard or quality, and electricity of a fixed voltage or pressure, in amounts and under conditions required by the state or by the town and city ordinances. It is customary to grant these companies the exclusive right to operate in the particular district for which they have been granted the franchise. No other company is then allowed to compete with them, but they are subject to fines or other punishment when they do not live up to their agreements. This protects the people from being supplied with an inferior product.

Gas is usually sold for so much a thousand cubic feet and electricity for so many cents a kilowatt-hour. The kilowatt is a unit of electricity, just as a foot is the unit of linear measure. It so happens that in the manufacture of either gas or electricity it is much cheaper, per unit, to make a large quantity than it is to make a small quantity. That is, the more gas or electricity the companies make, the lower is the price which they can charge the individual consumer for the amount used. This is the reason that our friends in the country so very often have to do without these conveniences. They live too far away from the locality in which there is sufficient demand to make it profitable for a gas or electric company to operate, because of the expense connected with laying the necessary pipe lines or wires.

Where people do not have gas and electricity, coal stoves are used for cooking and oil lamps for lighting. We find it hard to realize how many little annoyances were connected with the use of oil lamps. Lamps had to be filled daily, chimneys cleaned, wicks trimmed, and even with the best of care they were liable either to smoke or to give out a disagreeable odor. Many persons still use and even prefer coal stoves for cooking and water heating. The principal disadvantages in this connection are the greater attention required in keeping the fire burning and the necessary work in disposing of the ashes. We all realize the many advantages of electricity for quick, pleasing lighting effects and the advantages of gas for lighting, cooking, and heating purposes.

The public service companies, as they are called, require a very complete and efficient organization to give us a constant supply of gas or electricity at a reasonable rate. The constancy of the supply is especially important because at nearly every hour of the day and night a large number of persons are dependent on it. If someone in your family is suddenly taken ill during the night you get up, press a button, and the room is flooded with light. You need hot water for some purpose—the gas range is there to give you an instantaneous supply of heat. This is the service which gas and electric companies pride themselves on constantly giving you. This service requires many kinds of employment. Laborers dig the ditches for the pipes or "mains" or dig holes and erect the poles to carry the wires. These men are in charge of a foreman, who tells them what to do, and how and where to do it. The foreman reports the daily progress of his work to the superintendent, who spends part of his time in the office and part in supervising the work of the men. A clerk keeps a record of the time the men spend on each particular kind of work. The clerk is under the direction of an office manager or chief clerk. Stenographers, cashiers, bookkeepers, and many other classes of clerks are also under his direction, and he in turn reports to a general manager. The manager is usually reponsible to a board of directors who control the business policy of the company. At the manufacturing plant engineers direct the laborers, firemen, engineers, repair men, and foremen who are employed day and night keeping up steam and operating machinery.

One department takes care of new consumers by running service pipes or wires from the main lines in the streets to the houses, and then sets meters and connects stoves and lights. Another department takes care of the storage of supplies, the attention to complaints, the reading of meters, the calculation of bills, the collection of money, and many other details. Boys and girls are employed for some of the clerical positions, but they must be well educated, bright, and willing to learn. Boys who have not gone beyond the elementary school are sometimes employed as office boys and messengers. In the sales offices and in clerical positions women are usually employed, while men have positions in all capacities—from laborer to general manager. The organization is naturally larger and more complex as the size of the district supplied is increased. In some very small towns a great variety of work will sometimes fall upon one man simply because the sales of the company do not warrant the expense of the employment of more persons. In the case of small gas companies, for instance, one man may install meters, collect bills, take care of the distribution, and even do clerical work.

In the Eastern United States gas is made in two ways. One method is by distilling coal in retorts or ovens and the other is by forcing steam through a bed of red hot coal or coke. In the first system, which produces "coal gas," only soft or bituminous coal is used. It is placed in brick ovens or retorts and heated for several hours at a high temperature. Gas is given off by the coal and is collected, washed, purified, and pumped into large tanks or "holders." After the gas is all driven off, the substance which remains in the retorts (coke) is taken out, new coal put in, and the heating process repeated. The coke is sold as fuel.

In the second method gas is produced by steam being broken down by high heat into its elements, and these elements combining with the carbon in the coal. This gas, which is called "water gas," is washed, purified, and collected in holders in the same manner as the coal gas. Either coke or hard coal, known as "anthracite," may be used in this process. Many gas companies make both kinds, using the coke to help in the production of water gas. In producing gas numerous by-products result, especially coal-tar products, ammonia with its various compounds, and coke, which furnishes a clean, smokeless fuel. Many engineers make a life study of gas manufacture.

Coal, both hard and soft, also provides the energy which gives us electricity. Except where water-power is used, engines or turbines are driven by steam produced by coal. These machines do their part by revolving other machines, called "generators." Generators make electricity, and although it is often said that we do not know what electricity is, we do know a great deal about it. We know how it will act under various conditions. We know how to measure it—as simply as we measure the flow of water—and, best of all, we can control it, send it where we wish, and make it do all kinds of work for us. When electricity is made to work, its energy is used up and we are simply applying the energy which we have extracted from our old friend—coal.

Coal is the greatest factor in the manufacture of gas and electricity. Some day perhaps our natural water-power may be harnessed to such an extent that all of our electrical requirements will be supplied. This is perfectly possible from an engineering standpoint, but will mean an enormous expenditure of money and will take many years to accomplish. Until this time comes, however, we shall be dependent upon coal, and as the supply of coal is limited not a pound should be wasted.

A public service company producing gas or electricity offers attractive positions to men who have trained themselves by study until they are not only thoroughly capable of performing their chosen work, but are also able and willing to meet any emergency which may arise. A thorough knowledge of chemistry is necessary in order to understand the manufacture of gas and its by-products; and the training of an electrician is necessary in order to understand the production of electricity.

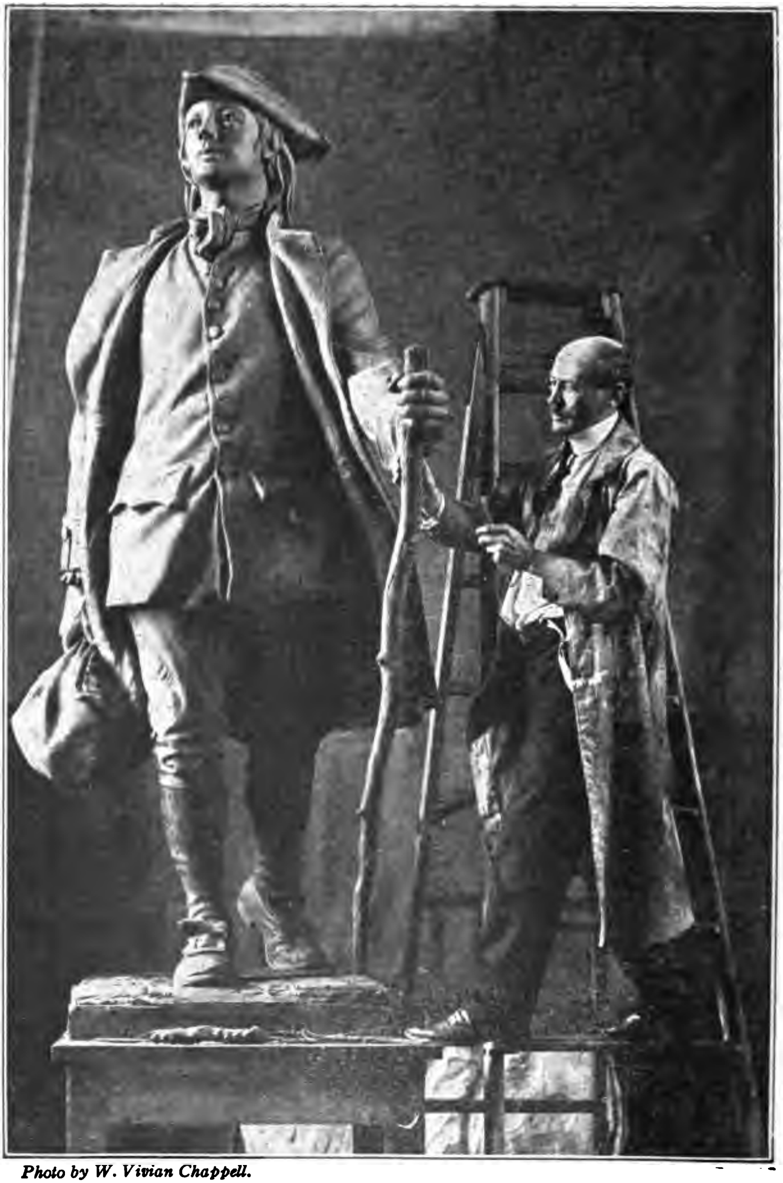


Photo by W. Vivian Chappell.

Dr. McKenzie at Work on Statue of Franklin.

V. PROFESSIONAL

ARCHITECTURE

ARCHITECTURE is one of the oldest of all professions, man's first instinct being to build something to shelter him from the weather. As civilization advanced architects were employed to make designs for temples, palaces, public buildings, castles, churches, fortresses, and monuments. Even some of the "Seven Wonders of the World" were designed by architects, including the Pyramids of Egypt and the Walls and Hanging Gardens of Babylon. From that time to the present day no building of importance has been erected without being first designed by an architect.

An architect must, first of all, have an appreciation of beauty and must be able to explain to himself and to others why certain things are beautiful. He cannot do this without thought, study, and comparison.

In addition to the sense and knowledge of beauty the architect must know construction, how to build all manner of buildings. This requires a natural turn for such things, which is indicated by a curiosity as to how things are put together, and which prompts you to ask questions of older persons. If you like to investigate and find out for yourself how things are put together, if you take an interest in watching the carpenter, the brick-mason, the plumber, or the painter at their work, then you may possess the second fundamental qualification of the architect.

The architect is the creator or designer of the buildings that are erected by other men in accordance with his plans, specifications, and personal direction; and the medium by which he illustrates his ideas, and through which he makes it possible for other men to understand them, is by drawing or drafting plans, designs, and details on paper. Therefore the architect should be an artist, not only in his sense and appreciation of beauty but also in his ability to make beautiful pictures. One of the first questions the owner of a proposed building asks is, "What will the building look like when completed?" So the architect must be able to make truthful sketches of his designs, made beautiful by color, pencil, or pen and ink.

He must also know how to draw every part of the building to scale, so that the builders will know just how deep to dig the trenches for the walls and foundations, how much stone or brick is required, and where and how to build the stone, brick, terra cotta, tile, slate, marble, and other materials so that they will take the form and dimensions shown by the architect's drawings. Therefore, if you have a talent for drawing and take pleasure in making sketches and diagrams—you have the third fundamental qualification of an architect. And if, added to the three points mentioned, you can honestly say that you enjoy the study of history and mathematics, and if you have good health, good eyes, and strong lungs (that will enable you to spend several years indoors), then it is safe to assume that you have the qualifications that will justify you in selecting architecture as your profession.

In order to design, an architect must be acquainted with the history of civilization from the earliest time to the present day, he must know the different architectural styles and types from the early Egyptian Temples to the Woolworth Building. He must also have a practical working knowledge of each one of the trades, so as to be able to direct the work of the excavator, the stone-mason, the bricklayer, the carpenter, the cabinet maker, the stair builder, the plasterer, the painter, the plumber, the electrician, the tile man, the roofer, the steel and iron worker, the reinforced concrete mixer, the carver of wood and stone, the sculptor who makes the models of carved work from the architect's design, and many others; so that in the end the building which he has designed and described in his specifications will be complete, with all its various parts fitting together as they should.

The profession of architecture is an ennobling one. In the study of architecture the student is brought into close contact with the rare and beautiful works of art of all ages, including paintings, sculpture, decorations, buildings, and furniture. He comes in touch with the best things that have been done since man first learned to paint, or carve, or build. He not only learns what kind of buildings these men built, but he comes to know what manner of men these old masters were—how they lived each day, under what form of government they lived, what battles they fought, what their amusements were, what language they spoke, and under what difficulties they labored. The wealth and beauty of the whole world is revealed to the earnest student of architecture.

Architecture is also a necessary profession, as it has to do with the planning and designing of the houses in which we live. We must also have schoolhouses, libraries, city halls, court houses, post offices, office buildings, churches, and many other buildings devoted to various purposes. So long as buildings continue a necessity so long will architecture remain a necessary profession; and so long as we demand these buildings to be beautiful will it remain one of the fine arts.

The steps by which you advance (and your time passed in school is the first step) are so gradual, and the means by which you become an expert draughtsman and finally an architect are so simple when followed consistently and perseveringly, that there is no cause for you to be frightened at the greatness of the task before you.

After your school days are over and you enter this profession your first period of development will be the drafting or drawing of plans, elevations, sections, and details. If it is necessary that you should be self-supporting from the moment you leave school then the practical thing to do is to become proficient in the making of neat, accurate tracings in ink on tracing linen. This training can begin at home during spare moments, or you can get it at a trades school or in one of the many evening classes. The fact that you can make neat and accurate tracings will do away with the necessity of serving a year of apprenticeship without pay, and will be of great assistance in procuring a paying position in an architect's office. From the moment you enter a drafting room as a self-supporting unit you will begin unconsciously to absorb, along with your studies and your daily work, the ambition to progress and to excel.

From this time on, the advancement you make in this profession is entirely dependent upon the manner in which you apply yourself. But of this you can be assured, that if you give to your work untiring and enthusiastic attention your advancement will be rapid.

In recent years the proper education of the young man who wants to be an architect has been made the subject of serious thought by the most able and best informed educators, with the result that nearly every college worthy the name offers a regular and also a special course in architecture. In addition, many institutions include short practical courses in architecture, which if thoughtfully pursued will equip the student with a good understanding of the theory of design and construction. Institutions such as the Drexel Institute, Philadelphia, have evening classes that are attended by the boys and girls who are employed during the day. These courses are open to all and are inexpensive.

But possibly the most interesting system of architectural instruction—the one which makes the strongest appeal because of the method pursued, the close association afforded with other ambitious boys and young men, and the sympathetic interest of the instructors—is the "Club System" of instruction in design which has been established by the Society of Beaux-Arts Institute of Design.

In every city of importance there are architectural clubs made up of young draughtsmen and architects. Originally these were merely social clubs, but a few years ago the men who had been so fortunate as to go to Paris and study in the great French government school called the Ecole de Beaux-Arts started to instruct the club members in the system of design taught in the French school. This idea grew until now nearly every architectural club and many private clubs have what is termed "Ateliers," and these have been combined into one great school called the Beaux-Arts Institute of Design.

The draughtsmen are formed into classes and are given problems in design and history suitable to their class. These drawings are examined by the instructors, and according to their merits are awarded mentions and medals, including travelling scholarships. The boy who wins one of these is sent to Europe for one or two years with all expenses paid. So you see that if you are ambitious a lack of money will not keep you from taking full advantage of the many opportunities for study and advancement, and if you fail to recive the proper training while you are young it will be no one's fault but your own.

ART

People who live in the country enjoy the beauties of nature, as each season brings its changes in the trees, grass, and flowers; but city dwellers also live in the midst of beauty, if they would but look at it.

Along some of the streets of a great city we see magnificent buildings showing against the sky in a varied and attractive "sky line." In the late afternoon when the street lights have just been lighted, or on a foggy day, beautiful things may be seen. Have you ever looked through the arch of the Widener Building, Philadelphia, from Chestnut Street? And have you ever seen Independence Hall in the snow? These are pictures fine enough to hang in any art gallery.

The shop windows also show many rare and lovely things which tempt us to go inside. A stroll through a big department store, where goods from all over the world are displayed, is somewhat like taking a trip around the world.

The advertising posters which greet us are frequently real works of art, designed by well-known artists. In the public libraries are many books and magazines, containing interesting and beautiful pictures. In the art galleries we have the opportunity of seeing fine paintings and sculpture, made by American as well as by foreign artists.

Everything made by man was at one time only an idea in someone's brain, and almost everything has been produced from a drawing or design which was made carefully and accurately before the finished article was manufactured. Since drawing is therefore so useful and necessary, it is interesting to find out what a person has to know in order to become a good designer.

First of all, the designer must understand the use of the thing to be manufactured. No matter how beautiful the article is, if it cannot be really used it is a failure. But if it is so made as to do its work perfectly, and if it is also graceful and attractive looking, it is a real work of art. Next, he must understand how the article he is designing is manufactured. If it be carpet, dress goods, or lace he must know something about weaving. But if it be printed silk, wall paper, oil cloth, or an advertising poster he must know how such kinds of printing are done. If he is planning something made of wood, stone, metal, glass, or leather he must have a good idea of the way these materials can be worked.

In order to design beautiful things the designer also must understand proportion, or the relationship which one part of the design bears to another. No part must be too big or too little to look well with all the rest. He must know what should be decorated and what should be left plain, and just where the decoration would look best on the article. He must know how to make beautiful patterns to put on things. He should understand how to arrange colors so that they shall be pleasing. He should be able to express his ideas in drawing or painting.

Now when you look at a beautiful thing do you like to try and find out what makes it look beautiful to you? Is it the form, or the color, or the pattern on its surface? Do you sometimes attempt to copy by yourself a pleasing pattern that you have seen? Do you like to invent and draw new patterns? When you have the opportunity do you put next to each other things which look well together? Do you try to wear colors which agree with each other? If you can answer "yes" to some of these questions then you have taken the first step towards becoming a designer.

There are many places where you can be taught how to become a professional designer. The public schools, with their courses in drawing and handwork, lay an excellent foundation. Then there are many art schools, some of which teach the painting of pictures, while others teach commercial designing. In addition to this, much may be learned by yourself in the art galleries, museums, libraries, stores, factories, parks, and streets.

Probably no other kind of work gives so much joy as planning a beautiful thing, and then seeing it actually manufactured from the design. The designer knows that many people will enjoy his work and that he has thus added something to the happiness of the world.

Do not think that just because you yourself may not make any beautiful work of art you cannot have a part in helping your city and your country to grow in beauty. Whenever you buy anything, whenever you choose anything, you have a chance to help. The more people there are who exercise good taste by choosing wisely, the more fine things will be made.

People show their character by the kind of things they wear and use. Are you satisfied with things that are poorly made and over-decorated? The amount of time, labor, and material needed to make showy articles, which do not wear well, could much better be put into simple things which would be both lasting and beautiful. Remember that the bad, the false, and the ugly are usually elaborate, while "the good, the true, the beautiful are always simple."

FORESTRY

Every American boy wants to make good. That is one reason why the choosing of an occupation or profession is one of the hardest questions he must face. He must know first himself, and then the different demands each line of work will make upon him, and what each one will offer him in return for honest effort. Then when he has made up his mind what he is going to do, he should give himself the best preparation for his future work that he can possibly arrange for.

Forestry as a profession is peculiar in this, that the men who take it up either fall deeply in love with it or feel entirely out of place. This is a special reason why the young person who thinks of forestry should have a clear conception of just what it is.

Forestry is the art of handling forest lands in such a way as to get from them the greatest service they are capable of rendering to their owner, whether that owner be a private individual, a State, or the Federal Government. The forester's object is to get from the forest successive crops of wood, which is the most universal of all materials, and without which the Nation cannot get along.

The practice of forestry includes more than merely walking through the woods in a green hat. Forestry is a serious profession, which requires as much vigor of body as it does vigor of mind. The man who succeeds as a forester is the man with high powers of observation; one who is able to take and live up to responsibility, and who does not need watching; one whose keen mind is balanced by a strong and hardy body. One who wants to take up forestry should have little regard for his own personal comfort.

The tasks of the forester are many. Besides handling his forest lands in such a way as to make sure that crop after crop of timber shall come to sound maturity, the forester must fight forest fires; build roads and trails and telephone lines; operate nurseries; plant trees; sell timber; conduct logging operations; protect the forest against theft, insects, and disease; advise and oversee campers, hunters, and fishermen; write reports; address public meetings; as well as direct the work of rangers, patrolmen, and laborers, and other employees under his supervision.

Fortunately, the profession of forestry although new in the United States has already reached a very high standard. That is one more reason why the student of forestry should give himself the best possible training.

Most work in forestry is, naturally, in the woods, which means that the forester must usually live either in a small town or in the forest itself. Unless he loves the woods and is deeply interested in his profession, he is likely therefore to be lonely, and this he should consider in advance.

It goes without saying that a forester must have courage, steadiness, and the capacity of getting things done. He must have the power of seeing and understanding the forest itself—the power of observation. Just as a doctor must understand his patient in health and in sickness, so the forester must understand the forest. The French speak of this quality as "the forester's eye." Without it no one can succeed in forest work. The second quality, after the forester's eye, is common sense.

Forestry is a form of practical statesmanship which touches the life of a Nation or a State at many points. Nothing, therefore, which affects the welfare of his fellow citizens should be indifferent to the forester. No forester can afford to remain ignorant of the facts and current questions of the day. No man can be a good forester unless he is a good citizen also.

There is no more useful work or wholesome occupation or profession than forestry, but the forester must look beyond the daily routine (often filled with drudgery) to what that routine is intended to accomplish. The trees a forester plants he himself will not live to harvest. He must keep it clearly in mind that he is working not only for the present, but for the far distant future as well.

The fact that he is doing a useful piece of work of the utmost public value is the forester's best compensation. The pay he will receive is not high, though some positions pay rather well.

There is, perhaps, no other line of work which promises a young man a better chance to be useful. A forester is a builder. He reconstructs the forests that have been devastated by the lumbermen and by fire; he is the best friend of the hunter and the fisherman; he has his hand directly on great questions which will affect the welfare of the Nation for all time to come.

Forestry is not a profession for weaklings in body or mind. The demands which it makes on the intellectual and physical powers are much greater than those of most other professions. Hence, any one who may be looking for an easy time had better choose a different line.

ENGINEERING

In every city there are streets to be laid out and paved, trolley lines and steam railroads to be built, bridges and waterworks to be constructed, sewage and drainage systems to be laid out and connected with all parts of the city, power plants and lighting stations to be erected to carry gas and electricity into our homes, and harbors to be built so that large ships may come in with their passengers and cargoes of freight. All these different forms of construction are carried on under the direction of the engineer, who plans and supervises them in much the same manner as the architect plans and supervises the building of houses.

While architecture is an ancient profession, it may be said that engineering is almost entirely a product of modern civilization. It is true that the Romans over 2000 years ago had developed the art of building harbors, bridges, and aqueducts, but most of the principles of modern engineering have been developed chiefly through the modern knowledge of the application of the great forces of nature for the use of man. The construction of the great power plants which furnish heat, light, and water to our homes, and power to our manufacturing establishments, is largely the result of the knowledge of the use of steam and electricity. The steam railroad has come into use only within the last hundred years, and the trolley or electric road within a much shorter period. One of the most remarkable performances of modern engineering is the construction of tunnels under rivers, and subways for trolley lines underneath our cities, in order that we may have faster transportation, unhindered by the traffic of the streets.

It will be readily understood that the work of the engineer is one of the most varied and one of the most highly skilled of all occupations. Most of the public works which enter into the building of cities are the work of the civil engineer, while the designing, construction, and operation of machinery have become a separate occupation known as mechanical engineering. Electrical engineering deals with the application of electricity in all the different ways in which it is now used as a source of power.

The actual work that is performed by the engineer varies greatly according to the branch of the profession followed, and the degrees of advancement of the worker. While most of the manual labor is performed by unskilled laborers, under the direction of the engineer, the latter must be thoroughly familiar with all of the operations involved, and be ready to turn in and assist or instruct his men wherever necessary. While the builder of bridges does not actually lay the stones or put the beams in place, he must know exactly how they should be placed in order that he may supervise his men intelligently. In the same way, the mechanical engineer who designs and supervises the building of a new machine must understand every nut and screw just as thoroughly as the machinist who makes the parts, and he must have the scientific knowledge and skill to calculate the size and position of each piece as well. The work of the engineer is therefore a combination of hand work and brain work.

The value and importance of a broad training for the engineer will be easily understood. All branches of the profession require a thorough knowledge of mathematics, a general understanding of the principles which underlie all science, a knowledge of the materials of construction, and of general business principles. In addition to this the engineer must have a highly specialized knowledge of all of the principles which enter into the particular branch of the profession which he desires to pursue—of mechanics or hydraulics or steam or electricity, as the case may be. To obtain all this knowledge requires both a very broad general education and a thorough training in one particular field.

The only way to become properly trained and fully equipped for engineering in any of its branches is to take a course in a university or technical school of college grade. If the boy can devote his full time to special training for four years after graduation from high school, he will have the best chance of making rapid progress in his profession. If he is unable to do this, he may perhaps take an evening course in civil engineering while he is employed during the day. Some institutions offer a number of short evening courses in different branches of engineering that may be pursued with great profit.

The man who would be successful as an engineer must be a man of action. While he should be interested in science, it should be on the practical rather than the theoretical side, for his work is not so much the discovery of the laws of nature as the practical application and utilization of those laws. He should possess common sense in the highest degree, and should be able to turn everything that he learns to practical use. If a boy is particularly interested in machinery he will probably make a good mechanical engineer, while if he prefers building or construction he would do better to take up civil engineering.

Most of the work which is performed by engineers is undertaken by large contracting firms, who employ a great many young men, under the direction of a man of proven ability and experience. The opening up and developing of new parts of the country causes the engineer—particularly the civil engineer—to lead a very unsettled life. One month he may be sent to work on a subway or a railroad terminal in a western city, the next month to assist in the construction of the Panama Canal in Central America, or to build a harbor somewhere along the coast. As he advances in his profession he may be placed in charge of the work in a certain city, and thus be able to acquire a more permanent residence in a given place.

The profession of engineering is growing rapidly, and few careers offer greater possibilities or surer success to the energetic, capable, and upright young man. While the salaries paid to young men without experience are not high, considering the time spent in training, there is unlimited opportunity for rapid advancement.

CHEMISTRY

ITS USE IN INDUSTRY

Everywhere in the world boys and girls are asking themselves the same question, "Is it worth while to remain in school now that I am fourteen years old and can get a job in a factory? Of what use will it be to me and to the rest of the world if I remain in school and study mathematics, physics, chemistry, and other such subjects?"

If we stop to think over this question it soon begins to answer itself. Take chemistry, for instance. Let us consider of what use it is to mankind. Here is what a chemist says:

A boy came to me recently and asked, "What are electric lights made of? They burn, and burn, but never burn up like coal or wood or oil; but just keep giving out light, hour after hour." So we sat down together for a half hour's talk.

It is an interesting story—that of the modern electric light. It runs this way: Down below the surface of the earth in Sweden is found a heavy brown mineral which at one time was called tinstone. In 1871 this was found to contain an acid which hitherto no one knew anything about. Scheele, the discoverer, named it Tungstic Acid.

Later, the wonderful metal which is now used in thousands of electric lamps was separated from this acid in an electric furnace. It is too long a story to tell here of how these men, patiently but surely, broke down this heavy stone with chemicals and heat to make tungstic acid; and of how, in the high heat of the electric furnace, in the presence of carbon (carbon, you know, is a solid found in coal or coke) they broke down the acid.

This breaking down of the acid caused it to give up its metal, which they called tungsten. Having obtained the metal desired, they drew it into wire and sealed it in the little globes of glass that make up our electric lamps.

It requires a very high heat to melt tungsten. We think iron is very hot when it is white hot, and very much hotter when it will flow in a silver white stream. But when you are told that tungsten must be twice as hot before it melts, then perhaps you understand why it can be kept at a dazzling white heat in the lamp bulb without even softening.

But this tungsten is only one of the wonderful things about our lamp. Did you every stop to think about the glass that is used in it? Probably not, because glass is too common a thing; it is all about us, in our windows, on our tables, in our lamps. Do you know that it is made from sand, just such quartz sand as is often found in the bed of a stream? This sand is melted up in large pots with chemicals, and while melted is blown into various shapes or rolled into sheets.

Could you make it? You say "No." Why not? You don't know how! You mean you do not know why this sand will unite with other substances, or how it does it; or, in the case of tungsten, why the brown stone will break up by the action of chemicals and heat. I hope you will know all this and much more some day.

These facts are all learned in the study of chemistry. After all, chemistry is only a study of the way the forces of nature act on the different substances that go to make up the earth and the air. From a few substances many different ones are made. From only three—namely, carbon which is a solid, and hydrogen and oxygen which are gases—such different substances are made as starch and gasoline, sugar and vaseline, butter and vinegar. Wonderful, isn't it, that such totally different things can be made up of the same elements?

But when you study chemistry you will learn how this is done. You will learn how, when you take air into your lungs, part of it is taken up by your blood and gives you life and strength; how your food is turned into muscle, and brain, and blood, and strength; how the heat of boiling water changes a hard potato that no one wants to eat into a good food that we all like and need. All these and many more wonderful things become perfectly clear to one who has studied chemistry.

Chemistry is used in all fields of industry. Indeed, I have been trying to think of a single large industry today that has not had to thank someone with a knowledge of chemistry for what it is. Think of the beautiful colors that are used to dye silk, and wool, and cotton, and linen. All these are made from that foul-smelling, sticky, nearly black material we call coal-tar. A knowledge of chemistry made it possible. Think of the strong explosives that will hurl a bullet or a cannon ball for miles. A knowledge of chemistry made them possible.

Think of the wonderful way we get our paper—the paper this is printed on, probably, or the newspaper that we buy, read, and throw away. Once this paper stood as part of a great forest tree, and the ink existed partly as coal in the ground and partly as oil in the flax plant. A knowledge of chemistry, coupled with engineering, made this possible.

You see what wonderful fields of business a knowledge of chemistry opens up to you: the dye industry, the oil industry, the paper pulp industry, the steel industry. All these and many more are built on chemistry. All must have their chemists and their chemical engineers. There are thousands of these men holding high positions in the United States today, and thousands more are needed.

Chemistry is big today, but it is only just past its beginnings. Modern chemistry is scarcely fifty years old, and is growing rapidly. I hope that you boys, many of you, and perhaps some of the girls, will join the ranks of the chemist and the chemical engineer. It is interesting and it is worth while.

But you will need to study. You cannot learn it in the shop or in the factory. The shop or the factory is too busy to teach you properly. You must stick to your school while you have a chance, go through the grammar school, through the high school, into college. There is no need for you to say "I can't afford it." You can. This education need not cost you one cent. There are plenty of scholarships to be had by deserving pupils, and plenty of things to do to earn your other expenses. And, best of all, it pays.

PHARMACY

Every one of you has at some time visited a pharmacy or drug store, perhaps merely to purchase a stamp or to get some medicine. As you entered the store you noticed the curious colored liquids and powders in bottles, bearing labels and strange names. In bright glass cases you saw the many patent medicines which are so often bought. Beside large mirrors familiar toilet articles, such as sweet smelling soaps and tooth powders, greeted your eye. Of most importance, however, was that mysterious room toward the back of the store where medicines were put up which your doctor prescribed in case of illness.

In this room the boy who desires to become a pharmacist receives his first instructions. At first, he does not don a white coat and stand smilingly behind the counter, but learns that he is expected to do such tasks as washing windows, running errands, and washing the utensils used by the pharmacist. He sells stamps, and in his spare time puts up packages under the direction of the druggist. In this way, through perseverance and observation, the boy becomes acquainted with the inside of a drug store. Gradually, however, his curiosity is aroused as to what the names on the large bottles mean and for what their contents are used. Then he discovers he must go to a college of pharmacy.

In order to enter a college of pharmacy the young man must complete at least two years of high school, and must also have some practical drug store experience. While he is in college he studies pharmacy, a subject dealing with the preparing, identifying, and combining of materials out of which medicines are made.

After having some college training, and two years' work in a retail drug store where prescriptions are filled, he is permitted to take an examination by the State Board, and upon passing this examination he becomes a qualified assistant. A qualified assistant may fill prescriptions under the direction of a registered manager. By this time he has become a more responsible man.

After finishing his college course and obtaining his diploma he may take another State Board examination. If he passes this second examination he is known as a registered pharmacist, which entitles him to take entire charge of a store.

During all this time the chief aim is so to understand the written instructions of a doctor as to be able to prepare the medicine ordered by him. To do this the pharmacist must learn to be very accurate in measuring and determining what is required, as the least mistake might prove fatal to the patient. He should also be extremely careful about cleanliness, for we have all learned that innumerable germs lurk in dirt.

Cases of emergency tax the self-control of a pharmacist, and he must prove equal to the occasion. When business is rushed he must not allow himself to become less accurate or to grow impatient. Also, a pharmacist must strive to possess another virtue, courtesy. His business thrives or slackens according to the courtesy he possesses. Even if a person should come in for a stamp while he is filling a prescription, he must remember that life is not so short but that there is time for courtesy.

Pharmacy is an occupation for women as well as for men. It is often necessary to work late in the evening and sometimes on Sunday. Any boy or girl interested in this profession, if old enough, will not find much difficulty in getting some experience as a beginner during the summer vacation. In this as in other occupations such employment helps a boy or girl to determine, while still attending school, whether the interest is real or merely a fancy.

MEDICINE AND DENTISTRY

A. THE PHYSICIAN

Of all the many kinds of work that men do in the world no higher form of service exists than that performed by the physician. The use of medicine is a comparatively modern art. Ancient people did not understand the difference between medicine and sorcery, and nearly all savage people still try to cure sickness by magic. They believe that illness is caused by devils which get into the body, and therefore try to drive out these devils by all sorts of incantations. Often methods are used which do the patient harm instead of good. One of the most important things which civilization has undertaken to do is to teach uncivilized countries the proper treatment of the sick, and one of the most important forms of missionary work is that of the medical missionary.

One of the first requirements of the medical profession is good health. The boy who would enter it should be able to endure long hours and hard work. He must go into it solely for the love of the work, and with the desire to relieve suffering, and no idea of fame, wealth, or worldly success should enter in. It is true that these may come after years of service, but he will have no true success if he makes them his first object. No work requires such unselfishness as that of the physician. He must put his patients' interest first at any hour of the day or night, no matter how it may interfere with his pleasure or comfort. He can never be sure of keeping an engagement or of taking a vacation from his duties, and his life must be a life of service.

But there are great compensations for the physician who is willing to make these sacrifices and whose heart is in his work. If his ideals are high and he has a real love for humanity he will be loved and respected in turn by everybody. The skilled physician often becomes the trusted adviser and personal friend. Frequently he is called on to become the healer of the mind as well as of the body. He enjoys the confidence and friendship of a great many people, and his social position is practically assured.

The doctor who understands his work and enters it with sincerity of purpose and a desire to succeed is practically sure of a comfortable income, though but very few doctors make large fortunes. Only great specialists are able to do this, and these are usually men of middle age and great skill.

It takes years of preparation to become a doctor. The boy must have a high school education and spend from two to four years in college before he can even enter the medical course. This, in turn, requires four years of specialized study, and even after graduating he must spend at least one year in a hospital. Furthermore, as it usually takes several years to acquire a practice the young doctor cannot expect to make much money before he is twenty-eight or thirty years of age. By that time, however, he should be able to make a fairly good income. The medical profession has often been spoken of as overcrowded, but this is not true.

Philadelphia has always been especially famous as a medical center. The University of Pennsylvania had the first medical school in the United States, and one of the few medical colleges for women is located in Philadelphia.

B. THE DENTIST

Another profession which ranks high is that of the dentist. American dental colleges are considered unusually fine, and students come to this country from all over the world to receive their education in our colleges. Moreover, a few cities offer courses in dentistry to women.

The work of the dentist is more confining, less broad, and perhaps less interesting than that of the physician, but it does not require so long a period of training or involve so great responsibilities. The compensation, as in the case of the physician, comes as the reward for skilful and sympathetic service.

The work of the dental surgeons during the late war has given new interest in their profession. This interest is being further increased by discoveries as to the close relation between diseases of the teeth and gums and other diseases not before supposed to be related to them.

THE LAW

As civilization advances and industry develops, and as life becomes more complex, it is necessary to have many more laws to regulate the relation of each individual to the community, and to see that his rights are properly protected. At every session of your state legislature hundreds of new laws are passed, and the same is true of the legislatures of other states and of our national Congress. To know and understand all these laws would be impossible for anyone who had not devoted his whole life to the study of them; and therefore the profession of the lawyer, who helps the government in enforcing the law and gives advice and assistance to the people who need its protection, has become one of the most important of the professions.

The general work of the lawyer falls into two main divisions—office practice and court practice. These are very closely related and both may enter into the work of a lawyer. Many lawyers seldom appear before the courts. Their practice is largely of a private nature, and their work consists mainly in explaining and interpreting the laws and giving legal advice to those who come to their offices. Many cases are settled without ever being taken into court. Such private practice constitutes a large part of the work of the profession, and young men who study law must look forward in the main to this kind of activity.

A court is an organized body of men, meeting at fixed times and places, to hear and decide upon cases at law and other matters that may be brought before it. It is presided over by a judge, who decides points of law that come up; while a jury of twelve men, chosen by lot from the voting list of the district in which the court meets, decides what are the facts in the case.

Criminal cases and lawsuits of many kinds cannot be settled by lawyers in their offices, but must be brought before the courts. It is the business of the lawyer in such cases to make a careful study of all the points in question and to plead the case before the court. A thorough knowledge of the law and a keen, quick mind which enables him to grasp whatever facts will be most convincing and to make the best use of them, together with a forceful, eloquent manner of speaking, are the most necessary qualities for the court lawyer. A thorough knowledge of the law in all its branches is the necessary qualification of the desk lawyer.

While many lawyers have a varied practice, there is now as in all other professions a tendency toward specialization in some one part of the field. This is particularly true in large cities. Some lawyers handle only real estate cases, and in fact many engage in that business. Some act as counsel or adviser for corporations, such as railroads and other large companies. Others confine their work to obtaining patents for persons who have made inventions and wish to secure the sole right of manufacture. Criminal law, of course, forms a large branch of the profession, which is followed exclusively by many lawyers. There are lawyers employed in connection with many different departments of the government, and many lawyers enter public service in some form or other. It is, of course, the highest ambition of nearly every lawyer to be a judge, as this is one of the greatest honors that can be conferred upon him.

The profession of the law affords many opportunities for usefulness and distinction, but it also has serious drawbacks. The field is already overcrowded, and although there is much money, much satisfaction, much honor for the man at the top, the average earnings are small. It takes years of preparation to become properly equipped, and usually years more before the lawyer can make a comfortable income. The high demands and the amount of competition make it inevitable that many who are not properly equipped should be unsuccessful.

In some states before one may begin the study of law he must take a preliminary examination, to pass which requires a high school education. He is then registered as a law student and after three years of study may take the state examination for license to practice law. There is a movement in many states to raise the preliminary requirements of law students; and already several law schools require that the prospective law student shall have a complete college education.

Until very recently the law was a profession open only to men, but within the last few years a number of law schools have opened their doors to women. Those who have taken the courses, however, have usually done so with a view to conducting an office practice only. Very few women have as yet become practising lawyers, although a few have won considerable distinction in this capacity.

In spite of the drawbacks, however, the boy who possesses an alert mind and a keen interest in legal matters, and who is willing and able to spend years in training for his life work and to wait patiently for even a moderate amount of success, will find that the law is one of the noblest and most honorable of the professions. The successful lawyer is everywhere recognized and respected, and his calling probably offers him greater opportunity for general advancement in almost every branch of public life than is presented to members of any other vocation.

JOURNALISM

Journalism is a big word that has several meanings; but the sense in which it is most commonly used applies to the gathering and writing of news for the daily papers. One who collects and writes news is a reporter. The person responsible for the publication of the news is an editor, and all editors are former reporters.

The news writer must be a sympathetic and thoughtful person, but, above all, he must be eager for hard work. He must know where to get the news and how to get it, and be willing to work long hours and at inconvenient times. Boys or girls who expect to become newspaper folk must realize that it is a profession which requires many sacrifices. In the majority of cases it is necessary to work at night, while others are enjoying the theaters or social visits with their friends, and sometimes for twenty-four hours at a stretch.

Do not think of becoming a reporter unless you have a natural liking for such work. If you have any difficulty in studying English do not expect to become a news writer. If you cannot write interesting compositions you had better think of entering some other vocation.

But if you are interested in other human beings; if you take a kindly attitude toward other people; if you like to write about things, and if you write good, clear English you are well qualified. If you are not suffering from any illness that would prevent you from going outdoors in unseasonable weather, and if you are willing to work hard without hope of riches you may become a successful reporter, and perhaps later an able editor.

Journalism is a vocation in which a good education is essential. There are some successful journalists who never were graduated from a high school and there are some unsuccessful journalists who have taken six-year courses in universities. But a newspaperman or newspaperwoman must be well informed. The man or woman who would collect information must be in possession of much general information. He or she must know history and something of science. The news gatherer must know the geography of his own city and the geography of the world. Education alone will not qualify you for journalism, but without it you cannot get far in the profession.

Journalism is an honorable occupation, and an interesting one. The successful reporter or the successful editor never becomes wealthy, but he earns a salary that enables him to live comfortably. Like all other professions, journalism yields smaller financial returns than manufacturing or mercantile occupations.

LIBRARY WORK

It is difficult for us to picture life where books are few and hard to get, because today our free libraries supply us with such a wealth of good reading that we perhaps fail to appreciate our advantages. Our libraries have rooms where we may sit and read books and magazines, lecture rooms where interesting and instructive lectures are given, a corner where books are reserved for reading in connection with lessons at school, and a room for the small boys and girls where stories are told and lantern slide exhibitions are given.

Some of you have thought that it would be delightfully easy to work in a library with an opportunity to read all of the latest books. It is delightful, but it is not easy for the person who wants to advance in the work, and there is little time for reading during library hours.

The qualifications for library work include a love of books, a love of people, and a desire to be of service to them. In addition, the librarian must be accurate, neat, and quick. To fill the higher positions she should have scholarship and real enthusiasm. By far the largest number of library positions are filled by women.

There are several ways of preparing for library work. One is to take a regular course of training at a library school, where a high school course or in some cases college training is a requisite for admission. Another way is to enter a library as an apprentice and gain practical experience in the routine of the various departments. The girl who serves a satisfactory apprenticeship in a library usually secures a position in, or through, that library. Summer courses are given in a few colleges and by state library commissions, but they are intended especially for those who have had experience in libraries already or have had a college education. It goes without saying that the library school graduate finds herself at home in any library, On the other hand, the untrained girl has to find her way step by step. Naturally, too, the trained person can command a higher initial salary.

Work in a library varies in importance from mere routine to the highest type of professional work, and may be briefly summarized as follows:

1. Mechanical preparation of books for circulation, including
    - (*a*) Pasting labels, bookplates, etc.
    - (*b*) Lettering books, bookplates, etc.
    - (*c*) Cutting leaves.
    - (*d*) Repairing damaged books.
2. Arrangement of books on the shelves.
3. Entry and care of periodicals.
4. Circulation or "desk work."

    Since the desk assistant deals directly with the public she should be courteous, tactful, and mentally alert.
5. Cataloguing and classification.

    The person of scholarly tastes who does not enjoy coming in contact with the public will be happier in this department of a library.
6. Reference work.

    One holding this position should be a scholar, or should at least be very proficient in the use of all reference books.
7. Children's librarian.

    Girls who have a gift for story telling, and who have the true teacher's spirit, are successful in this branch of library service.
8. Library administration, including order department.

    Business ability, a general knowledge of books and their values, and a thorough comprehension of the community and its needs are requisite to success in this capacity.

Library training is of value also in business and professional offices, where the classification, indexing, and filing of trade and professional material are becoming important features.

The salaries paid for library work are seldom large and they vary as widely as do the positions. At one extreme we find the assistant, who does clerical or routine work and who begins at about the same salary as an unskilled stenographer. At the other extreme is the librarian-in-chief, whose duties are on a plane with those of other professions. The Librarian of Congress, who is in charge of the largest collection of books in America, receives less salary than a Congressman.

Though wealth in dollars and cents may never be acquired in the field of library work, yet for the person who really loves books and prints, the person for whom the simple act of handling books or opening and cutting magazines has charm, a wealth of knowledge is sure to be hers—knowledge of books, knowledge of affairs, and knowledge of human nature.

TEACHING

Many of you are talking about what you want to do or to be when you are "grown up." Among the many people engaged in useful work you have no doubt thought a great deal about the teachers whom you know. Every day you see them caring for children, big and little, in your city. Probably you have tried to think of what things would be like if there were no teacher in your life to lead you in getting knowledge, in finding places to play, and in forming good habits.

Long before you began to think of such conditions the state had thought the matter out, and had decided that it could not provide for its children properly without the teacher. Therefore every government plans to take good care to find teachers. This in itself makes it worth while for you to think about this line of work.

The teacher is always captain of such an interesting team. Every day the captain meets his team of thirty or forty boys and girls and coaches them in the art of living. Team work must be taught in the classroom, in the yard, on the streets, in the home, and in places of assembly such as public halls or picture galleries. The pupils must be taught by the captain in school day by day for perhaps fourteen years to work together, play together, and live together. The government must prepare these captains, so we find everywhere training schools for teachers. Possibly you can mention some such normal school.

The teaching profession places a man or woman in a position of respect in a community, and offers an opportunity for a happy, satisfactory career. Many of the great physicians, lawyers, ministers, and men in other professions owe much of their success to their early training as teachers. But there are also many men and women who become equally famous as great teachers, never leaving their profession. People travel many miles to meet them, and their classes are sought by students from near and far. Their writings are found in the most learned books. They work out in their laboratories, with their students, scientific secrets which lead to inventions. Or perhaps they discover great medicines which cure disease and bring health. In their observatories others search out with their students the mysteries of the heavens. Teachers are not infrequently sought as statesmen to represent their people in law-making and executive positions.

Teachers have an opportunity to develop executive power. Just stop and think of the executive power your teacher must use during one morning's work in your class-room. Notice how smoothly your lessons and exercises fit into a program; how your bodies, books, papers, pencils, clothes, etc., are looked after; how the teacher finds plenty of time and strength for each reasonable demand made by a pupil or another teacher, by the principal or superintendent.

Also note the responsibilities of these executives as they become principals of large school plants or superintendents of many schools, which must be run with the least possible expense to the city and yet provide for the greatest number of children. Also think how capable these executives must be to be able to go into business circles and show to keen men and women that school business is being carried out right. They must be able to prove that the school buildings are being erected according to the very best plans for school activities. They must be able to show that each community is receiving from the school the very best teaching service. They must understand and prepare for the normal growth of population in different parts of a school district and the call for greater school activities in the near future. These men and women in executive positions must travel, to observe for themselves the latest improvements in the school business throughout the country; and they must do all things so correctly that the state or city will know that the best has been done.

Teachers' old age is cared for by wise business arrangements. The women who teach all their lives are more likely to be alone when they grow old. The men generally spend most of their money in clothing, feeding, and educating their families, so they have very little left for themselves and their wives in their old age. All this happens because school men and women have little chance to grow wealthy. Their salaries, which may look rather large at first, do not grow enough to meet the demands made by their lives as the years go by. Of course these men and women have very little opportunity to make extra money, because they are not among business men during business hours. Therefore in former times a school teacher was not to be envied, because he had so little to provide for his old age, and so the teaching profession was shunned.

This is now changed in many places by a large fund of money being put out at interest by the school system. This interest is used as a pension for teachers who have finished their work and who have come to the rightful age of retirement. In most cases the teachers contribute a part of their salaries to the pension fund every year. This makes the interest greater and ensures the teacher a small income when he retires. This assurance of ease and rest after a life of hard work makes it possible for young men to choose the profession with minds free to spend a large part of their salary to their own best personal and professional advantage during their working days.

So you find your teacher friends interesting, not only because you respect them but also because they have traveled and seen and done much. During their long vacations, and even during their working days, they have put their money into college work or some sort of extra study which has made them broad minded, big-souled men and women of many-sided interests, with hearts free from anxiety for their future.

When you choose your life work study the men and women you know. Measure their work in its influence on those men and women themselves, because first of all a person is responsible to himself for his development into his own biggest self. Next measure it in its influence upon the community in which the individual lives, because from that biggest self comes the possibility of service to the other human beings whom he meets. With these tests in mind, should you choose to serve your state in the capacity of a teacher, give freely of yourself, that you may be an honorable member of your chosen profession.

THE MINISTRY

It has been said that in most instances when a boy decides upon his life-career he chooses his vocation, but in the case of the ministry he is chosen. This idea is expressed in other terms when we say that a certain man has a "call" to enter the ministry. No boy should ever undertake to be a minister unless he feels distinctly that he has such a call. In no other vocation is success so dependent on one's heart being in the work, and he who would follow it must do so first of all for love and a profound desire to help his fellow-man.

The work of the minister is familiar to everyone. Not only must he conduct the services and preach the sermons in church on Sundays, but he must act as adviser and friend to every member of his congregation, visit the sick and suffering, and stand ready to extend a helping hand to all who are in sorrow or need. He is the friend of all mankind, and must be willing to sacrifice all material benefits for the sake of serving others.

Although a deep religious conviction, high ideals, and a true love of humanity are perhaps the most essential qualities for a minister, it is very important that he should have a gift for preaching besides. Hundreds of people are looking to him for guidance in the great truths of religion, and in order to guide them wisely he must be a teacher as well as a friend. Preaching is usually the result of education and experience, but there are certain natural qualities—a gift of eloquence and inspiration—without which no one will ever become a good preacher. A little experience in public speaking or debating will soon show whether a boy has these qualities. If he fails there, no matter how deep and sincere his purpose, he had better not consider the ministry; for however good a pastor he may be, he is only performing half his task if he cannot pass his knowledge of religious truth on to his fellow-men with force and conviction.

Throughout the middle ages the Church was the leading institution in all matters of learning, and for many hundreds of years the priests were almost the only people who could read and write. While it is fortunate that the rest of the people are so much better educated today, it is unfortunate that as a class ministers have not kept their position as educational leaders. The minister, almost more than anyone else, needs the knowledge and discipline of a liberal education. If he is to be a leader on moral and religious questions he needs a broad knowledge of all of the affairs of men. The Church of today needs more than anything else the type of man who is interested in great social and civic movements, and stands ready to lead the people in matters of public as well as private virtue.

While a college education may not be necessary, it is certainly of very great advantage to the boy who is preparing for the ministry. As the course in most theological schools is three years in length, and the applicant must have at least a high school and preferably a college education before he enters, he must expect to spend a fairly long period in training for this vocation.

It is a well-known fact that of all the professions probably none is so poorly paid as the ministry. No boy, therefore, should ever enter it with any thought of money or worldly advantage. The successful minister is usually assured of a living income, but beyond that he must not look. His pleasure must come chiefly from joy in his work, and his rewards will be spiritual rather than material. The satisfactions of the ministry are such, however, as appeal to the highest type of men—the love and gratitude of their fellows and the satisfaction which comes from helping others and awakening their minds to higher things. Men of this type make themselves and their cause necessary to the happiness and welfare of their people.

NURSING

About seventy years ago, during a terrible Russian war, the hospitals were crowded with wounded soldiers who were suffering agonies through lack of proper food and care, while thousands who might have been saved were dying from wounds and disease. The rude shelters then in use were gradually turned into decent, safe, well-managed homes for the sick through the intelligent and skilful nursing of one woman and her band of assistants. This woman was Florence Nightingale.

It has always been one of the special duties of woman to care for the sick, but up to that time nursing had been done by any who were sympathetic and well-meaning, with such knowledge as they might have gained through personal experience. It is only since the time of Florence Nightingale that nursing has become a profession of the highest rank, requiring special and scientific training.

In a general way the nurse in the hospital or the home is responsible for the personal care of the sick person. She carries out the doctor's instructions regarding medicines and diet, assists him in operations and treatment, watches all important developments in the condition of the patient and keeps the doctor informed, prevents the spreading of disease, and acts as assistant to the physician in many ways.

It will be easily seen that such duties and responsibilities demand a very great amount of knowledge and skill. The trained nurse must understand the human body thoroughly in all its parts, she must know the nature and causes of disease and the

Photo by American Red Cross.

"Service to Others."

different methods of treatment, and she must be able to handle sick people and meet critical situations wisely and promptly. This can be gained only through a systematic course of lectures and class-room work, together with long experience and constant practice in the actual conditions of the sickroom.

To acquire all this knowledge requires a long period of training. In most of the schools and hospitals offering training courses for nurses the course is three years in length, although in a few it can be completed in two years. Nearly all of them require the applicant to be at least twenty years of age and to have some high school education, graduates of high schools being greatly preferred. Girls are usually taken on probation for a period of from two to three months, after which time if they are admitted as students they receive their board and lodging, and are usually paid a small allowance each month for books and uniforms. Although unable to earn anymoney until the age of twenty-three or twenty-four, the girls thus become self-supporting during the period of training.

While in training the nurse is required to live at the hospital and to give her entire time all the year round, except for a few weeks' vacation. She is usually on duty about ten hours a day, and is expected to perform night duty during a part of the time.

The course in the training school is very strict, and much hard physical work is often required of the student, especially during the period of probation. The tasks assigned include the making of beds, the care of the rooms, sweeping and dusting, the serving of lunches and washing of dishes, and cleaning and disinfecting of instruments and utensils. Later, after the student has passed the period of probation, she is relieved of some of these duties, and spends more of her time in assisting the doctors and nurses in the care of the patients and in the performing of operations. Nearly all training courses include some instruction in invalid cookery and the preparation of diets for the sick.

When a girl has graduated from the hospital training school she may take up private nursing or obtain a position in a hospital, home, or other institution. With the exception of head nurses or superintendents in hospitals the private nurse usually receives the highest salary, but there is often a good deal of time when she is not actively employed. In view of the fact that living expenses are nearly always included, it may be said that as a class the salaries paid to nurses are higher than in almost any other occupation for women.

Under no conditions can the work of the trained nurse be said to be easy, although in certain cases the circumstances and surroundings may be very pleasant. One of the first qualifications necessary to enter the profession, and without which a girl cannot even be admitted to a training school, is good health. The hours are long and confining, and frequently the nurse must work with little sleep. She must be able to endure physical hardships and many inconveniences.

The successful nurse must be tactful and good tempered, and have intelligence and common sense; she should be resourceful and adaptable, and able to act quickly and wisely in case of emergency. She must be obedient and able to carry out instructions and to conform to strict rules of discipline. She must be willing to put her patient's interests before everything else and, above all, she should have a real love of nursing and a sincere interest in people. It is also important that she should be neat and attractive in appearance, and have a quiet, pleasing manner.

Many new opportunities for nurses have arisen lately in connection with social work. Visiting nurses are sent out by societies to go into the homes of the poor and care for those who cannot afford to hire a nurse for themselves; this is usually known as "public health" nursing. The public schools in most of our large cities employ nurses to visit the homes of the pupils who are ill and give them assistance and care.

There are also opportunities for girls who are unable to spend the time required for the full nurses' course, to secure training which will equip them for positions with invalids, where expert knowledge is not required. The work of the nursery maid will be interesting to the girl who has the qualities of a nurse, and is especially fond of children. Some of our children's hospitals have short courses of training for this line of work. In none of these lines, however, will the girl have the same standing or be able to make as much money as the fully trained professional nurse.

It is only in recent years that men as well as women are taking up nursing as a vocation. Many men prefer to have a man rather than a woman to wait on them in times of illness, and there are many positions as companions and personal attendants to invalids which are coming more and more to be filled by men.

THE DIETITIAN

In hospitals, where special diets are necessary, the service is placed under the direct supervision of a dietitian who plans the diets which have been ordered by the physician for special types of illness. For such service she must know the constituents of foods and their uses in the body, as well as the most palatable and digestible form of preparation.

Dietitians are needed not only in hospitals, but also in camps, in boarding schools and colleges, in fact, wherever large numbers of people are to be fed. The field for this type of service is broad and not crowded with workers. The well trained dietitian who cares to enter business can establish herself as caterer or as manager of a tea room, or she may open a shop for serving special diets.

The requisites for such positions include a love for the work and sufficient knowledge of the processes to do the work successfully. The training necessary to gain sufficient knowledge of the processes involved includes a high school education and at least two years of special training in a school which instructs in the chemistry of foods and food values with the allied branches. This training frequently is followed by a short course, from four to nine months, in hospital service under a trained dietitian.

The income for such positions depends upon the type of service rendered and the skill and business ability of the dietitian. However, the wage is not the only incentive for this type of service. A dietitian has an unusual opportunity to render valuable service to humanity, and it is the consciousness of this which makes any work a joy.

SOCIAL WORK

We have always been taught that it is our duty to help our neighbor when he is in trouble. But we have only recently come to recognize the fact that it is the duty of society (that is, all of us together), to take care of these unfortunate ones who by reason of poverty, sickness, or crime are unable to take care of themselves. For this reason we have founded in all of our large cities various charitable organizations such as children's aid societies, settlement clubs and classes, social centers, societies for organizing charity, and many other kinds of institutions through which man may help his less fortunate brother. With the development of these institutions "social work," as it is called, has become a definite vocation offering large and varied opportunities for service.

Although social work is one of the youngest of the professions, the field covered is a wide and growing one. Its object is to insure to every individual more of the things he needs, to the end that the welfare of the community may be improved.

Roughly speaking, social work is divided into two kinds: first, that which deals directly with individual people. This is called "social case work." The second kind deals with the conditions of living and work which surround them. This is called "social mass work." The nature of the two main divisions of social work, and the qualifications necessary for success in either, vary sufficiently to make necessary separate statements about each.

Social Case Work.—There are at least four situations in which people may need the professional services of a social case worker. First, a family may fail to support itself for one reason or another, such as unemployment, illness, or death of the breadwinner. A normal family is self-supporting. To help make a plan so that such a family may become independent again is one task of the social case work.

Second, children sometimes become orphans or, even worse, are neglected or abused. Society is so interested in the welfare of its children that the need of these unfortunates must be met. This involves the aid of a social case worker to supervise and care for such children in boarding or free family homes, in institutions, or in their own homes.

Third, a boy or girl sometimes fails to progress normally in studies because, for one reason or another, the school and the boy or girl in question fail to fit each other. Often adjustments are needed on the part of each. Again, the boy or girl about to leave school for work may need to recognize the danger of becoming a misfit in industry. He or she needs to know what are the opportunities ahead and what qualifications one must possess to grasp them. The social case worker in the school or in the junior employment exchange renders all these various services. In some cities "visiting teachers" take care of such cases for the schools.

Fourth, people under medical treatment in a hospital or dispensary often fail to benefit by their medical treatment because of home conditions, financial situation, or ignorance of English. The social worker in the hospital must know the social conditions of the patients and make the readjustments necessary to the improvement of the individual's health. When the patient concerned is sick mentally, special knowledge and skill is needed. There is a special type of social worker who supplies this need.

Social Mass Work.—There are conditions existing in many if not all communities which are not good for the health and happiness of the people. These include bad housing, bad sanitation, bad industrial conditions, inadequate facilities for play and recreation for young and old. To remedy these conditions, it is often necessary to develop in the people new ideas of community needs and a new responsibility for meeting these needs.

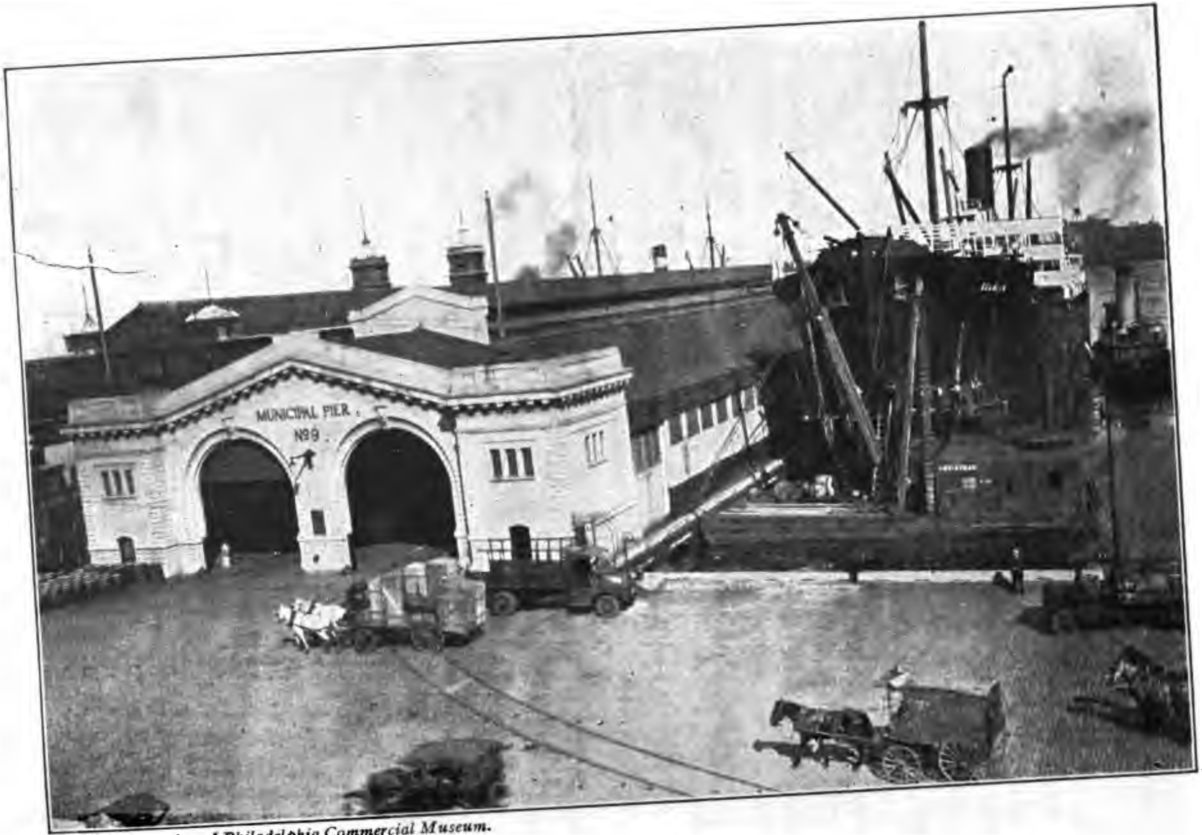
Efficient workers in the field of mass work must know how to look over a community and find out its needs, and must also know how to organize the things it has, its resources, so as to secure the greatest benefit for the people. They must also be able to develop and direct group activities. They must be able to educate and mold public opinion and, when necessary, to see that new social laws are passed and enforced.

All social workers must be old enough and have sufficient intelligence to deal with social problems. Before their technical training begins they should have studied those sciences on which a knowledge of society is based, such as history, economics, biology, psychology, and sociology. These are college subjects.

At least two years of special technical training are necessary in preparation for this profession. Part of this time will be spent in class instruction by skilled social workers, and part in outside practice work under careful supervision. There are at present scattered throughout the country about fifteen training-schools that are preparing for the profession of social work. They are usually connected with universities, in one way or another. Several of the older schools are, however, independent.

To be a successful social case worker one must care about people, and have that understanding of human beings that makes for friendly human relationship. These qualifications are also valuable for the social mass worker; but possibly other elements of personality count for more, such as ability to plan wisely and to exercise real leadership.

The financial rewards in social work compare fairly well with those of the other professions, with the possible exception of medicine and the law. However, there are other rewards in life than those of money, such as the satisfaction that comes from serving others. This satisfaction the social worker enjoys, along with the minister and the teacher.



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Where the Big Ships Load.

VI. CONCLUSION

ETHICS IN BUSINESS

Do you ever wonder why it is so difficult for some boys and girls, even with a good education, to get and hold a position and to advance in it? If we look at some of the things employers count, perhaps it will be easy to understand.

First of all, the employer looks for the prompt carrying out of his orders. The girl or boy who delays, who has to be asked more than once to do a thing, takes too much of his employer's time and attention, and makes the employer feel that he can never be relied upon. Consequently, the employer will never advance him to a responsible position, and if he finds someone more prompt to carry out his orders he will not hesitate to replace this employee with another.

Another thing which is absolutely fundamental in business is cleanliness. This does not mean merely a clean face. It means clean hair, clean hands, clean finger-nails, clean bodies, and clean clothing from the skin out. A very bright and capable high school graduate was recently criticized thus: "We liked Miss Smith's work. It was very good, but there was an odor about her, as though she were not clean." Think of the humiliation of being discharged for such a cause! Employers also speak very definitely in regard to hands. "I don't want a boy with dirty finger-nails," is a common remark, or: "I don't want a girl who covers her face with powder and paint." Employers seem to have an idea that powder is used as a substitute for soap and water.

Neatness in one's personal appearance is also essential. The employer feels that an employee who is careful of his own appearance will be orderly and neat in his work. If he is a typist he will have his type clean, and his letters will present an attractive appearance. If he is a bookkeeper he will have no smudges or blots on his work. A tidy dressmaker will take care of the materials entrusted to her. The neat person will have his work arranged in an orderly manner, so that he will know how to find it. This is most important, for if one's things are in disorder it takes a great deal of valuable time to straighten them out.

The attitude of the girl or boy toward the employer is very important. Not long ago a girl went to apply for a position. In the office was only one chair, which the girl took. When the employer came in, the girl remained seated throughout the conversation though the employer had to stand. "It gave a bad impression," the man said, and he did not employ the girl. It is absolutely necessary to remember that one's employer—man or woman—is one's superior in a business way, and should be treated with respect. This always results in a corresponding respect for the worker by the employer. Along with this should go an interest in the employer's business—an endeavor to make it a success. When work is urgent there should be a willingness to stay a little longer at noon, or in the evening, or to come a little earlier in the morning. No one can be successful without this interest, which will lead to a consideration of something more than the pay that is to come at the end of the week.

Just as essential is it to co-operate with one's co-workers. If there are disagreements it will delay work, and the employer will make it his business to find people who can work together without friction. Moreover, a friendly attitude and a desire to help will always bring good results. Your fellow-workers will like you and help to make your work easy, so that in the end the best results are obtained for all concerned.

In one of the banks in Philadelphia there was a clerk who had been in their employ about a year. She had no special training for her work beyond a high school education, and she was not at all quick at figures or clever in any way. Yet she held a good position largely because of her willingness to co-operate in every way possible, because of her interest in the bank, and, one more trait, her punctuality. She was never late. Her employers knew that she would always be at her desk, ready for work, at the time appointed. If school children only realized the importance of forming a habit of punctuality there would be no latenesses on their records.

Another trait that is essential in business is absolute honesty. That does not mean merely in the handling of money. It means truthfulness on all occasions. Taking the blame where blame is due, honestly admitting mistakes, giving your opinion frankly where it is called for, though at the same time withholding it unless asked, all of these things mean that you place yourself in a position of reliability and the employer knows he can turn to you when help is needed. Honesty, of course, includes thoroughness in one's work. It is not honest to slide over a piece of work, hoping it will slip past the employer's notice. The person who does this is unfitting himself for advancement, for if he cannot do the little job satisfactorily he surely is not capable of managing the big one.

The boy or girl who starts business life backed by a good education, and who follows the suggestions given above, is sure to succeed. The value of such a person is soon recognized. Sterling qualities are everywhere sought in business, and are rewarded according to their merits. So, from a business point of view it is well to have high standards and to make every effort to live up to them, for we all want to be numbered, not with the failures, but with the successes in life.

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